

THE COST  
OF FOOD  
• A STUDY •  
• IN DIETARIES •

• ELLEN H. RICHARDS •  
• And JOHN F. NORTON •

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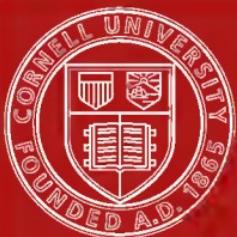
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# THE COST OF FOOD

## A STUDY IN DIETARIES

BY

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THIRD EDITION

REVISED UNDER THE DIRECTION OF

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## PREFACE TO THE THIRD EDITION

AFTER nine years most of the statements in the preface to the second edition still hold true in principle. While there has been an increase during this time in the price of raw food materials, there has been a still greater change in standards. This is due partly to increased knowledge of our nutritive needs as shown in the "irreducible minimum" estimate of 22 cents per person per day, and partly, of course, to increased luxury.

This edition is offered in order to continue the usefulness of this little book of Mrs. Richards'. It is still hers. Revision has been made only where present-day ideas are radically different from those of ten years ago, with an attempt to give costs more nearly those of to-day. The figures used are chiefly those of 1915-1916, since it is difficult to determine a basis at present on account of the inflated prices of 1917. A comparison of the prices of a few foods in New York in 1901 and 1916 will illustrate the general trend.

Food.	1901.	1916.
Round steak.....	\$0.12-0.14	\$0.28-0.30
Cheese.....	0.14-0.18	0.20-0.22
Butter.....	0.32	0.37
Sugar.....	0.06	0.09
Bread.....	0.05	0.07
Bottle milk.....	0.07	0.10
Loose milk.....	0.05	0.08
Eggs.....	0.12-0.24	0.40-0.60
Potatoes.....	{ 0.01-0.02 lb. 0.60 bushel	0.04-0.05 lb. 1.50 bushel

The United States Bureau of Labor statistics show that retail food prices in the United States advanced 19 per cent in the year ending with January 15, 1917. The increase in four years was about 30 per cent. Some of the advances were:

	Per cent.		Per cent.
Sirloin steak.....	7	Cheese.....	27
Round steak.....	8	Milk.....	11
Rib roast.....	8	Bread.....	13
Chuck roast.....	7	Flour.....	38
Pork chops.....	10	Corn meal.....	23
Bacon.....	8	Potatoes.....	57
Ham.....	4	Onions.....	58
Lard.....	22	Beans.....	39
Hens.....	16	Prunes.....	5
Salmon.....	7	Raisins.....	16
Eggs.....	32	Sugar.....	16
Butter.....	18		

A chapter has been added to this edition in which the planning of meals is taken up from a somewhat different standpoint with the hope that the book's usefulness for the non-scientific housekeeper will thereby be increased.

The reviser hopes that the book will be of service to those thoughtful women who are interested in obtaining for themselves and their families the best which they can afford. He makes no claim that it is in any way his, and hopes that it will be received as one of the many writings of the one whose name is known and will always be remembered wherever Home Economics is discussed,—our beloved Mrs. Ellen H. Richards.

Acknowledgments are due to Miss Jenny H. Snow of the Chicago Normal College, and to Miss Winifred Gibbs of the New York Association for Improving the Condition of the Poor, for material added to this edition.

I have been particularly aided by my Mother, Mrs. Alice P. Norton, now Editor of the Journal of Home Economics, and by my Wife.

JOHN F. NORTON.

CAMBRIDGE, MASS.,

*April, 1917.*



## PREFACE TO THE SECOND EDITION

IN reply to the many questions asked, the author wishes to state here that because the cost of the *accustomed* food of the average family has increased since the book was written, and because the price of board in restaurant and boarding-house has increased thirty per cent or more, it does not follow that all food has so risen in cost. From the great variety and abundance of food materials offered to-day the purchaser may choose sufficient and nourishing food, which need not cost more than the prices given here. But it may not be just those materials to which the palate has been accustomed. Certain foods have gone out of fashion, corn meal is used very little, although in digestibility and palatability it outranks most of the prepared cereals sold for ten times as much per pound.

The morning cream is a costly viand, but sugar is still inexpensive. Butter may be had at a very little if any advance. It will not be "gilt edge," but it will be just as wholesome and nutritious. Olive oil may be found at the Italian shops and many other foods may be purchased of the less known dealers.

Therefore it is pretty certain that the cost of nutrition has not advanced so much as the current opinion calls for. It is true, however, that it requires time and attention and a modification of one's tastes to secure this nutrition, and this modification is the most distasteful exercise the ordinary person is called upon to undergo.

Perhaps the most instructive comparison is that of the cost of food at Valparaiso, Indiana, given on pages 112-114, of this volume, from data obtained by the author during a personal inspection in 1892. It was then \$1.40 a week and room at 25 cents. Mr. George Kennan in *McClure* for March, 1908, gives the costs at \$1.88 and fifty cents for room. This is in accord with the general trend of things. External factors, table linen, service, decoration, lights, furnishings — in short, the refinements of living have increased the cost of living, often doubling it, and just so far as these factors come into play in the serving of food they increase the cost of *board*, but not necessarily the cost of the raw material which is used.

It is advisable to add a certain amount of this cost for the sake of refined living, but there is a limit to which the efficiency of the individual is increased by this addition. There is nothing in the discussion of costs which the author wishes to "take back," and certain conclusions are only confirmed by seven years' experience and observation. The study enjoined on page 11 is still needed, and the question at the top of page 65 is still pertinent. Some recent books are listed at the end of the Bibliography.

BOSTON, *March*, 1908.

(*Added by Mrs. Richards to the 1913 edition.*)

An examination of the same markets for the same kind of foodstuffs showed that in August, 1910, 15 and 25 cent per day per person dietaries would cost 18 and 27 cents respectively. This accords with all other recent investigations, namely, that the really staple articles

bought with time and care plus knowledge are not so greatly increased in cost. When the question is of the \$1.00 a day dietary the cost to-day is increased to at least \$1.50 and it may easily go to \$2.00. The common food materials like corn meal, rice, macaroni, dried fruits, flank and T bone are not used. They are considered too common and therefore "unclean."



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# THE COST OF FOOD

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## CHAPTER I

### FOOD A NECESSITY. KNOWLEDGE OF FOOD- VALUES A PRESENT-DAY NECESSITY

"The physiological principle of the preparation of food is summed up in the postulate that it shall produce the highest efficiency in the individual and the race." — THUDICHUM.

THE food-supply is the controlling factor in all life, vegetable, animal, or human. In proportion as suitable food is abundant, so thrives the living thing because of the ease with which it satisfies its appetite. In the case of human food this ease is expressed in terms of money. Abundance means comparatively little cost of any article, so that it may be easily obtained by numbers of people. Therefore in presence of abundant food-supply prosperous communities are found. The plant must grow at the spot indicated by the presence of its food. The animal may range forest and plain in search of it. Early man did the same, and peoples grew strong where space for pasturage or fertility of soil gave opportunity for herds and crops.

Twentieth-century man, by his development of means of quick transportation of foodstuffs from all quarters of the globe to any desired spot, has changed the problem so entirely that the small cost of any food material no longer depends upon its production *in situ* by the com-

munity which is to consume it, but largely upon its trans-  
portable character.

Wheat flour is cheap because, raised with comparative ease, it can be prepared in quantity on the spot where it is grown, and kept in storage or carried around the world without appreciable deterioration. Fresh fruits are dear because they will not endure this handling and storage. They must be cooled, desiccated, or preserved. Refrigeration, though increasing the possibility of storage, implies investment of capital and additional labor, with the resulting increase in cost. This reason for cost is so often overlooked that it is worth while to emphasize it at the outset. The errors in buying food-supplies have their root in the mistaken notion that whatever is obtained at small relative expense is common and unclean; that the use of such food is a mark of plebeian tastes and leads to very low mental development. As a matter of fact the cost of food is no measure of its nutritive value. "Cheap" food is that which has required little capital or labor to produce.

Formerly each race adapted itself to its environment and trained its digestion in accordance with the available diet. In great measure the races of earlier ages were modified by the possibilities of food in the lands to which they migrated. The influence of food upon character has yet to be adequately studied and discussed.

In America to-day, the situation which confronts us, whether working man, student, or millionaire, is not how to get food enough, but how to choose from the bewildering variety offered that which will best develop the powers of the human being and make him efficient,

and, what is of greater importance, how to avoid that tempting variety, indulgence in which weakens the moral fibre and lessens mental as well as physical efficiency. So long as it is the popular belief that brilliancy of mind or position is chiefly due to luxurious food, served with the disguises of the chef's art, so long will the aspiring politician and novel-writer change from one boarding-house to another in search of variety, and children will continue to demand the luxuries of the table unrebuked.

In spite of all preaching, few really *believe* that plain living goes with high thinking. Most, either consciously or unconsciously, attribute American versatility and success to the richness and variety of food so easily obtained. Neither moralist nor sanitarian has begun to ask whether the increase of crime, of insanity, of certain forms of disease, of moral recklessness, is not attributable to the debilitating effects of the food set before us, to the lowering of ideals of living so well exemplified in the details of the fashionable table.

In the case of plants, the importance of nutrition to the organism has long been recognized. The gardener produces leaf or blossom at will, and even changes color and form, by the substances he furnishes to the growing plant.

The American farmer and wage-earner thinks he has made a great advance when he can say, "We keep help now and my wife and daughter can sit in rocking-chairs and read novels," but with the leisure and lack of interesting occupations comes the habit of nibbling sweets with the novels, the perverted taste in food as well as literature. The girls have more food and less work than is good for them, with the logical biological result that

grandchildren fail. It is not over-education but over-nutrition which threatens race extinction. To quote Prof. Patten:<sup>\*</sup> "Formerly the underfed failed to survive, now it is the overfed among whom the elimination is taking place. The ideal of health is to obtain complete nutrition. Over-nutrition, as well as under-nutrition, weakens the body and subjects it to evils that make it incapable of survival. The plethora of food now enjoyed induces men to eat and drink more than their systems can stand. . . . Must we look among women for the best examples of over-feeding? . . . It is said that all female animals become barren when overfed. . . . Cheap food and a sugar diet, therefore, make the conditions out of which the thought movement of the present epoch will proceed."

Man has a wide range of activities, and because he does not see the separate result of any one, he is not sensitive to its effect. Man, also, has great adaptability, and abuses it by too sudden changes. Desire for food is one of the fundamental race instincts, and in pre-scientific days was supposed to take care of itself under all circumstances. Even now it is usually assumed to be a safe guide in food if not in drink. A distinguished physician has recently said:<sup>†</sup>

"This splendid instinct — appetite — so necessary for our existence — especially in early times — has now more than ever to meet with sudden modifications resulting from the complexity of modern life. While primarily responsible for the discovery of innumerable ailments, the very abundance in this generation, both

\* "Development of English Thought," pp. 379-387.

† Dr. Charles G. Stockton. "Hygiene."

in quantity and variety, is embarrassing, and we find the results of unnecessary and artificial stimulation in the unnatural desires for food. The lack of attention as to the appropriateness of food subjects not only the digestive apparatus but all the cells of the individual organism to distress and not infrequently to disease. In this matter the problem to be solved is, first, how to train the appetite into natural and wholesome paths, and, second, how to live so that by means of proper physical, mental, and moral activity there may be successfully oxidized the kind and quantity of nutriment required in normal life, and that there may be successfully discharged the waste products that result from the oxidation. . . .

"It is unsafe to trust the individual to the guidance of the appetite alone, for the reason that this instinct was built up for a condition of existence very different from that which enables the people of this country to indulge themselves to-day."

It is also true that appetite can be educated, directed, like any other habit, but it is still a common superstition that likings for food are inborn traits.

It seems to be most difficult to inculcate the principles of right living in the face of this superstition, especially in the face of the intense individualization so widely taught — namely, that each person is a law unto himself. Respect for natural laws, obedience to the fixed principles which govern all living organisms in order that freedom of activity may result, is most unwelcome teaching. The bearing of this attitude upon habits of life and cost of living is very evident. Every effort to inculcate saner ideals is met with scoffing, with unproven

assertions, and with a demand for freedom and unrestrained choice as a mark of American liberty. Men have yet to learn that "independence cannot with safety be made to apply to their relations with nature."

Scientific sociology must take account of these beliefs and tendencies and inaugurate a series of studies of existing conditions and a controlling series of experiments before any definite conclusion can be reached. The following suggestions are given for the purpose of indicating lines in which such studies and experiments are desirable.

It is freely acknowledged that many of the statements have no basis of mathematical proof — only a foundation in observation of years and of a somewhat wide range of conditions. If they can be scientifically refuted, well and good. But, if they are true, thoughtful young men and women will do well to take heed to their ways before it is too late.

*Cost of food is a result of several factors.*

Seed — a bushel of potatoes or corn withdrawn from consumption;

Rent for ground to grow the plant or graze the animal;

Fertilizer to renew the productive power of the soil;

Labor to plough, plant, cultivate, gather; or to feed, water, and keep clean the animal;

Machinery — utensils, wear and tear;

Interest on capital invested — building and equipment;

Waste due to rainy or dry seasons, to disease of both plant and animal;

- Preparation for market, transportation, distribution; mismanagement of raiser, packer, transporter, distributor;
- Inevitable loss in dressing for the table, uneatable parts;
- Indigestible portions, natural or produced by cooking, which must yet be paid for;
- Preparation for the table; cost in labor and time, and waste in digestion, natural and due to wrong choice.

If once the public can disabuse its mind of any idea of close connection between "food value" and cost—namely, that a cheap food is a poor food, that a dear food is a good food — then a beginning in scientific dietaries can be made. The cost of a food depends upon how many of these factors enter into its history before it is placed on the table.

Pudding costs more than oat-meal mush because of the greater length of time required in preparation; because skilled labor is necessary for the preparation and transportation of the ingredients.

The excessive cost of board to-day is due to many other things besides the cost of raw materials. When a man pays \$20 a week for "table-board" he pays for fragile china, neat aprons and caps for the maid, time of the cook in garnishing, choice of dishes, etc., etc., so that the raw material he consumes forms barely one-third the total cost.

The cost of food is not only its money cost, it is the cost to the body to appropriate it which must be considered.

Man is an adaptable animal, but he often abuses his

power by asking for its use too often and by making too sudden changes. He can live on the most diverse kinds of food as he can drink the softest or the hardest water, if he has been brought up to it, but sudden changes are apt to be disastrous.

A man treats his stomach as if it were a thing apart from himself — an inanimate machine and a very simple one at that, not likely to get out of repair. Engineers know how to get the best work out of their engines, and they have learned that it pays to take care of the machine. Man's digestive apparatus is more delicate and complicated than any machine, and yet he treats it with indifference, neglect, and even contempt. He runs it without trying to understand it, and blames everything but himself if it gives out. In pioneer days circumstances were the stern teachers of wisdom, but now temptations to indulgence are on every street-corner and at every family table. Men go on as if they were made of cast iron, as if by mere will power they could make poisons into food.

To a watcher of events it is maddening to see the crowd rushing on to destruction, not seeing the precipice and not believing any warnings, attributing the disappearance of friend after friend to any but the right cause.

When a man drops dead in the street his friends say, Oh, he has been living at high pressure; he has had many business cares; he has tried to do too much; he inherited that tendency. They never say, He was so careless or foolish or foolhardy in his eating.

There are none so blind as those who wilfully shut their eyes, and in all food matters we are wilfully blind. The day of reckoning will come, however.

In the interest of the race, of its mental as well as physical development, there is no subject which should occupy the attention of educators comparable with that of food and its influence on human progress.

If, as in some other things, there were an alternative, it would not so much matter, but nature has not provided a substitute for food. Nothing can take its place. It is a condition of life, and right food is an essential of efficient living.

This being an indisputable fact, it seems strange that all discussion of it is tabooed in educational circles; and still more strange is it that teachers, of all persons, are the most careless and reckless in matters of diet. The very people who would profit most by right habits of living seem most oblivious of the fundamental principles.

It is therefore hopeless to expect to impress the pupils through the teachers, hence outside influence must be brought to bear on both. Naturally it should come through the parents, the mother chiefly, while the children are young, but the father whomingles with his fellows and sees more of life should watch for his share in the general training along progressive lines.

It has become too much the fashion to allow children a greater range of electives in food than in studies, to set before them a bewildering variety and applaud rather than disapprove a whimsical choice.

So much has been done in the way of popularizing knowledge that persons are not willing to do any thinking for themselves. If a new word appears in the daily paper, it must be explained by a synonym of easy comprehension. If a scientific fact is announced, it must be couched in terms of every-day currency.

Mental laziness has come to be a distinct characteristic of the mass of the people who have been taught facts or supposed facts without having had to think for themselves. Hence it happens that when the subject of food is broached and such terms as protein, carbohydrate, and metabolism are used, a repellent, rebellious mood is felt sweeping over the audience. Indeed, it is often voiced in the request to use every-day language, to tell in plain terms what these things are.

This is often impossible; at least it would mean occupying time and space in definition so that none would be left for discussion. In the glossary will be found some definitions which may be of service to those reading this book.

These few chapters do not form a compendium of knowledge. A wide acquaintance with generally accepted facts and a certain groundwork of the fundamental sciences, such as chemistry, physics, and physiology, is assumed to be the preparation of the student. If bacteriology and physiological chemistry are also in a measure in his possession, so much the better. No attempt is made to give a popular treatise upon a subject requiring so much concentration of attention and systematic study. Only a small section of a very large field is prepared for the seed which will be dropped into it from time to time from current scientific periodicals and reports. Some of the seeds will prove to be weeds, and will be pulled up and thrown away, but the ground will be kept in condition to grow the good grain as fast as it is found.

The scientific attitude of mind, namely, to suspend judgment while the little plant of knowledge is growing,

is important. Neither accept nor throw away an idea until it has proved itself a weed or a good food for further growth. The science of nutrition is still in its infancy.

A study of food may be divided into three chief lines:

*1st.* Food substances or stuffs and their office in the body;

*2nd.* Food materials in which the foodstuffs occur;

*3rd.* The relative cost of the right amount of the foodstuffs when derived from the various food materials.

The aim of the present study is the third, which is, however, influenced not only by the kind of food, but by the preparation and combination to which it is subjected outside the body, and by the mental and physical condition of the body receiving the prepared food. Some future writer will be able to combine results of these three studies into a handbook which may be followed. Neither the cook nor the public is yet ready for this.

If "food is that which builds up the body and furnishes energy for its activities," or if "food is that sum of foreign substances which taken within the organism enables it to grow and perfect seed in the plant, to grow and manifest activity in the animal, to grow, to manifest activity, and to think thoughts new and old in man," it behooves us to learn something about these substances which the organism uses. Among other sources of information the reader will find the data he needs in Bulletins of the United States Department of Agriculture and in such books as "The Fundamental Basis of Nutrition,"

by Graham Lusk.\* The bibliography on page 138 furnishes suggestions.

These sources have been available only in recent years, so that it is not strange that middle-aged housewives are not familiar with the technical terms used.

The younger women, however, should see to it that even the arithmetic of dietaries becomes full of meaning, and that a respect for the value of properly selected and prepared food should be inculcated with the children's other lessons.

\* Lusk. "The Fundamental Basis of Nutrition." Yale University Press. Price, \$0.50.

## CHAPTER II

### FOOD FOR THE INFANT AND THE YOUNG CHILD

ONE way in which to determine what substances are food for mankind is to study the composition of the natural foods, of milk, for instance, which is the universal food of the young mammal. This will prepare the way for the study of the food of other animals, both young and adult.

TABLE I

	Specific gravity.	Water, per cent.	Protein per cent.	Fat, per cent.	Sugar, per cent.	Mineral salts, per cent.
Human milk. (200 analyses.)						
Minimum.....	1.027	81.09	0.69	1.43	3.88	0.12
Maximum.....	1.032	91.40	4.70	6.83	8.34	1.90
Average.....	....	87.41	2.29	3.78	6.21	0.31
Cow's milk. (800 analyses.)						
Minimum.....	1.026	80.32	2.07	1.67	2.11	0.35
Maximum.....	1.037	90.32	6.40	6.47	6.12	1.21
Average.....	1.031	87.27	3.55	3.64	4.88	0.71
(5552 analyses.)*						
Average.....	....	87.1	3.2	3.9	5.1	0.7

\* Van Slyke.

We find milk to consist of 87 per cent water. The other substances are either in solution in the water or are suspended as a fine emulsion. The above table shows that there are four general classes of substances present:

- 1st. Proteins — albumin, casein, etc.;
- 2nd. Fats — "butter fats," compounds of glycerine and the so-called fatty acids;
- 3rd. Sugar — milk-sugar, one of the many sugars known in nature, a so-called carbohydrate;
- 4th. Mineral salts such as calcium phosphate.

Besides these there are certain other food accessories sometimes called vitamines, some fat-like substances called lipoids, and other substances in small amounts.

Since the young animal can live and grow for a considerable time on milk alone, it is evident that with the exception of air, we have in milk the elements of animal nutrition. If we examine any animal organism — fish, worm, insect, or the human body, we find the same substances or similar ones which may be grouped under these general heads. Therefore we may assume that the thousand materials used as food must contain these same substances in varying proportion.

The tables of food composition are therefore made out in terms of these classes. A few words of which to learn the meaning, and yet hundreds of intelligent persons turn away from any book on food where these words meet the eye! Truly we are a lazy people when it comes to intelligent effort.

To make it as easy as possible, we will begin with the food of the infant. At birth the child weighs, on the average, 6.5 lbs. (girl), 7.3 lbs. (boy). Its first effort is to breathe in the air that gives the needful oxygen for the transformation of the food it next cries for. Upon this food (of which it takes one-seventh its weight daily) and inhaled air it gains an ounce a day in weight and finds energy for constant activity. As activity increases the

gain in weight lessens, and one-half ounce per day is a fair average. At the end of the first year 13 or more pounds have been added. At maturity the muscle increase has been 50-fold, that of the skeleton 25-fold, that of the total body weight 18-fold. The following figures give, approximately, the composition of the body compared with that at birth.

RELATIVE BODY COMPOSITION

	At birth.	At maturity.
Skeleton.....	16%	16%
Muscles.....	23	42
Fatty tissue.....	14	10
Other tissue.....	31	47

During this first year, the child has taken something like 500 quarts (1000 lbs.) of milk containing about 40 lbs. protein, 40 lbs. fat, and 50 lbs. sugar, or 130 lbs. of food, to give 13 lbs. in weight. This gives a little idea of the office of food in the body; of how much is used up in mere living, and in motion, and how little goes to body tissue. This increase of actual substance is still further cut down by the fact that part of this weight is water, although not so great a proportion as is the case in later life, when bones and brain have practically ceased growing.

We are just at the beginning of the scientific study of infant nutrition, but we do know that, wherever possible, it is safest to keep to the natural diet for the first few months.

As the child grows, substitutes are found in other foods. Starch replaces part of the sugar; meat tissue,

part of the casein; vegetable oils and animal fats, part of the milk-fat; while the mineral salts are found in all materials.

When some solid food is added, the same relative composition must be kept. That is, the solid food must not be all protein or all starch or all sugar. The protein from animal sources may be given in the form of eggs, yolk preferred, chicken, fish, a very little mutton, and from vegetable sources in oatmeal and whole-wheat, or in some of the patent preparations when they are what they seem, and in lentil or pea-flour used for thickening broths. The starchy food may be of rice, potatoes, macaroni, the cereals carefully chosen, and rusks, pulled bread, or Zwieback.

Sugar is now generally advocated as food\* for young children, not as amusement between meals, but as part of the dietary and counted as such. A pound of candy yields nearly as many heat-units or calories as a child of fourteen needs in its whole day. If, however, the child satisfies its appetite with this candy, it defrauds its body of the "building" material which the candy totally lacks, of the fat which seems equally necessary, and especially of the lime salts, phosphorus, and vitamines. Of the 10 ounces or more of carbohydrate which a child of 14 generally uses, perhaps 4 ounces may be in the form of sugar. This is the quantity of milk-sugar which a child of three or four years would adsorb if its diet were of milk exclusively. Cane-sugar is, however, more disturbing to the digestion and should, therefore, not be held as innocuous as milk-sugar.

This allowable amount of 3 or 4 oz. should, however,

\* See Mrs. Abel's "Sugar as Food."

form part of regular meals or of a definite luncheon, as will be indicated in the discussion of the school luncheon. This amount includes that naturally in the food. Perhaps three-quarters of an ounce is enough to add in the form of pure sugar. The following table indicates the gradual increase in the child's food.\*

TABLE II

Children of 1-2 years	900-1200 calories
Children of 2-5 years	1200-1500 calories
Children of 6-9 years	1400-2000 calories
Children of 10-13 years	1800-2200 calories
Girls of 14-17 years	2200-2600 calories
Boys of 14-17 years	2500-3000 calories

In the child's diet there is 1 part of protein to 4.5 of fat and carbohydrate. In that of the adult the ratio is 1 to 5.5 parts.

In the child's diet there is 1 part of fat to 3.7 carbohydrate. In that of the adult 1 to 1.6 parts.

The child is more active in proportion to his weight than the adult, and therefore needs a larger proportion of calories in his food. His body also presents nearly three times the surface in proportion to his weight, and therefore loses more heat, an additional reason for more heat-producing food. This is shown particularly in the last column of Table III.

The list given in Table VI should furnish variety enough, since great care must be taken to form habits of eating plain food, without condiments or stimulants, in order that full bodily and mental development may take place. Less variety is needed by a well-trained child than by an adult. An indiscretion in diet in these formative years may result in atrophy of some cells,

\* Sherman, "Chemistry of Food and Nutrition."

wrong tendencies in others, and permanent nerve displacements, just as a pin-prick in the undeveloped bud will leave a scar which shows during the life of the tree. The child has not the reserve store of the adult and cannot go without food safely for any considerable time. The digestive organs are excessively delicate, easily irritated; therefore hard, coarse, dry foods are (as a rule) prohibited; also spices, condiments, and all nerve-irritants.

TABLE III \*

Age, years.	Weight.		Food requirement without muscular labor.	
	Kilos.	Pounds.	Total per day, calories.	Per kilo body weight per day, calories.
I	10	22	1000	100
5	17	37	1400	82
10	26	57	1800	70
15	50	110	2800	56

\* From Sherman, "Chemistry of Food and Nutrition."

It is also true that a taste for highly spiced food, for sweets, etc., may be fixed by a very little unwise indulgence, especially since habit rather than instinct guides civilized man in the choice of food. It is the first taste that costs: no sane mother would give her child coffee or wine; why should she yield to its curiosity and give spiced foods and rich gravies? If the child is not taught to be whimsical and fickle in appetite, he will rarely make any remarks about his food. Alas, he usually hears too much for and against food, and as the parrot's vocabulary betrays his ship companions, so the child's fancies betray his parents and nurse.

It is, on all accounts, best to adhere to a simple, well cooked, nutritious diet until the child is 15 or 16; then the digestive organs will have gained their full strength, and for the next 20 years may be trusted with anything in reason.

As has been said, milk is the universal food of the young mammal, furnishing that which is needed for growth and repair, for muscle, bone, and tissue, and also in its sugar and fat the energy used in keeping the body warm and active.

The young chick finds in the egg all the food that is needed except that for activity. Since its opportunity for motion is very slight, it grows, develops, makes blood and bone and muscle, so that the chick steps forth from its shell a perfect animal strong enough to stand, with wit enough to eat, but requiring at once cornmeal to furnish the starch for the activity which the young mammal derives from the sugar in the milk.

Since the egg is so nearly a complete food, and so easily transformed into animal tissues, it is well to study its composition and to compare it with milk, meat, and fish (see Table IV).

The growing chick, before activity begins, needs 74 per cent water, 12 per cent protein, 10 per cent fat, and in addition 1 per cent mineral salts. One egg-shell equals about 6 grams. It is possible that part of this is used as needed. Oxygen for the metabolism of the egg contents must come in through the shell. It is clear that the egg contents are not sufficient for the *activity* of the chick, since its appetite at once develops for corn meal as well as for grubs; neither are they dilute enough to furnish water for evaporation and for that general

tissue exchange which motion of body increases. Water, being the heat regulator of the body, is constantly being lost and hence must be supplied in the food in greater amount than is needed for mere existence. We learn, then, that eggs are not sufficient in themselves for the active child. They contain too little water, too much

TABLE IV \*

Foodstuffs.	Refuse, per cent.	Water, per cent.	Pro- tein, per cent.	Fat, per cent.	Food value per lb., calories.
Milk, whole.....	....	87.1	3.2	3.9	314
Egg, as purchased.....	11.2	65.5	11.9	9.3	596
Egg, edible portion.....	....	73.7	13.4	10.5	672
Egg, yolk.....	....	49.5	15.7	33.3	1643
Egg, white.....	....	86.2	12.3	0.2	231
Chicken, broilers as purchased.....	41.6	43.7	12.8	1.4	289
Fowl, as purchased.....	25.9	47.1	13.7	12.3	751
Beef, round, lean, as purchased.....	8.1	64.4	19.5	7.3	652
Halibut, dressed.....	17.7	61.9	15.3	4.4	457
Salmon, dressed.....	29.5	48.1	13.8	8.1	582

\* Compiled from Sherman, "Food Products."

nitrogen, but we also learn that they must contain the right proportion for body building, and therefore are a valuable food, especially when there is a demand for just this kind of sustenance, as after fever, in cases of nerve exhaustion, as well as for growing children. As in milk, the substances found in eggs do not exist by themselves, but in combination one with another or several in a more or less loose connection. Thus the sulphur and phosphorus seem to be a part of the protein or in close association with the fat in the form of lecithin. It is barely possible that this group may be utilized with less expenditure of energy than some other forms of matter for

nerve building and nutrition; only a limited amount can be assimilated in a given time, therefore it is not to be supposed that a diet of eggs can be used to force brain development.

The foods nearest in composition to eggs are the various meats and fish, as is to be expected from the fact that flesh is formed in the egg from its contents. Meats, however, differ in that they contain the products of the decomposition due to muscular activity, to breaking down of tissue, such as urea, and they also are more or less rich in the tough connective tissue which holds the bundles of cells in place and serves as ropes or straps to join muscle to the framework of bone. The fat of muscle, both interstitial and enveloping, lacks the high mineral content of the egg-fat combination, the latter occurring only in marrow and brain to any degree, so that fat of meat is not a perfect substitute for fat of egg.

The various cuts of meat differ largely in regard to the amount of fat, both interstitial and enveloping.

Fish as a rule contains less fat and the edible portion runs only slightly lower in protein than meat. There is usually a large amount of refuse. In general it may be used as a substitute for chicken and veal.

It is evident that lean meat in an amount that may be used does not furnish sufficient heat units for normal human life and that very fat meat must be eaten to bring up the calories. It is well known that the child, as a rule, has a distaste for fat, therefore a leaf may be taken from the diet-book of the chick and starchy foods be added as soon as milk ceases to be the sole food. This must not be done until the child's digestive juices are able

to transform starch into an assimilable sugar, which is at about the ninth month. Even then a limited amount only is given until the second year.

Since the mucous membrane of the child is of a most delicate and easily irritated texture, it is unwise to give food which has much woody fibre or indigestible substance until greater vigor of digestion appears. Therefore the oatmeal is better strained, "oatmeal jelly," and the wheat and barley pearled. If abundance of milk and eggs are given, white bread and rice may serve, but where the cost of the former is too great, the necessary mineral salts must come from whole wheat, oatmeal, peameal soup, strained.

It is unsafe to use any cereal food which happens to be put upon the market with the idea that all cereals are alike digestible. Experiments on children are costly.

The reader is advised to study the diet of the infant and young child as to quantity and quality, to become perfectly familiar with the composition of these 20 foods (Table VI), and with the combination of them into suitable menus.

The child's food still contains much water in the form of ripe fruits, soups, and milk, but if bread and butter is the staple, then much additional water should be allowed. An example of a child's menu for one day is given in Table V.

If the reader wishes to become familiar with dietary work, this sort of problem, worked out in a variety of costs for two different ages with the substances given in Table VI, will serve as an excellent introduction. For books on children's diet, consult the bibliography.

The young mother is advised to keep closely to the

TABLE V

## CHILD 2-4 YEARS OLD \*

<i>Breakfast:</i>	Oatmeal	Mush	0.8 oz.	Dry Cereal
7.30 A. M.	Milk		1½ Cup	
	Stale Bread		1 Slice	
	Orange Juice		4 Tablespoons	
<i>Lunch:</i>	Milk		1 Cup	
11 A. M.	Stale Bread		1 Slice	
	Butter		1 Teaspoon	
<i>Dinner:</i>	Baked Potato		1	
1.00 P. M.	Boiled Onions	(Mashed)	1	
	Bread and Butter		1 Slice	
	Milk to Drink		1 Cup	
	Baked Apple		1	
<i>Supper:</i>	Boiled Rice		1 Cup	
5.30 P. M.	Milk		¾ Cup	
	Bread and Butter		1 Slice	

## NUTRITIVE VALUE AND COST

Material.	Weight, oz.	Protein, grams.	Fuel value, calories.	Cost.
Rolled oats.....	0.8	4.2	100	\$0.0030
Stale bread.....	2.0	7.0	200	0.0080
Orange juice.....	2.0	.....	25	0.0150
Butter.....	0.5	0.1	100	0.0110
Potato.....	2.6	1.3	50	0.0020
Onion.....	1.0	0.5	14	0.0030
Apple.....	2.0	0.2	26	0.0100
Sugar.....	0.2	.....	23	0.0006
Rice.....	1.0	2.3	100	0.0050
Milk.....	34.4 (1 qt.)	32.2	675	0.0800
		47.80	1313	\$0.1377

## SUBSTITUTES OR ADDITIONS.

For Rolled Oats or Rice: Other cereals, such as rolled wheat, wheaten grits, farina, hominy, and corn meal.

For Orange Juice and Baked Apple: Prune pulp or apple sauce.

For Onions: Spinach, strained peas, stewed celery, carrots, or cauliflower tips.

An egg may be added every day, and should be included at least two or three times a week.

These changes will alter the cost somewhat.

simple diet of very few foods and, as was said earlier, not to give "tastes" of other foods; on no account to permit the tasting of tea or coffee. If eggs and cream seem to make the little one's diet as costly as that of the grown-ups, remember that these few years determine the child's future. The money spent now can well be

TABLE VI.\* — APPROXIMATE COMPOSITION OF SOME COMMON FOODSTUFFS

	Per cent.					Calories per lb.
	Refuse.	Water.	Protein.	Fat.	Carbo-hydrates.	
Apples.....	25.0	63.3	0.3	0.3	10.8	214
Barley, pearled.....	....	11.5	8.5	1.1	77.8	1615
Beef, round.....	8.5	62.5	19.2	9.2	....	724
Beef juice.....	....	....	4.9	0.6	....	113
Bread, white.....	....	35.0	9.1	1.6	53.3	1198
Butter.....	....	12.7	1.3	84.0	....	3488
Cheese, American.....	....	35.0	25.0	34.0	....	1994
Chicken.....	41.6	43.7	12.8	1.4	....	289
Eggs, whole.....	11.2	65.5	11.9	9.3	....	596
Lentils, dried.....	....	8.4	25.7	1.0	59.2	1581
Milk, whole.....	....	87.1	3.2	3.9	4.8	314
Mutton, leg.....	18.4	51.2	15.1	14.7	....	874
Oatmeal.....	....	7.3	16.1	7.2	67.5	1811
Peas, green (edible portion).....	....	74.6	7.0	0.5	16.9	454
Potatoes (aspurchased).....	20.0	62.6	1.8	0.1	14.7	302
Prunes, dried.....	15.0	19.0	1.8	....	62.2	1160
Raisins, dried.....	10.0	13.1	2.3	3.0	68.5	1407
Rice.....	....	12.3	8.0	0.3	79.0	1591
Wheat, cracked.....	....	10.1	11.1	1.7	75.5	1635

\* Compiled largely from Sherman, "Food Products."

saved later. Above all remember that a wrong diet means irritability, bad temper, and general discomfort. The healthy animal is a happy animal. As has been indicated above, 15 to 20 cents per day, where food has

to be purchased at city rates, gives a fair average for a child of four to six. Where only half that can be spent, there is always danger that some organ will suffer. Well-cooked corn meal and whole-wheat bread made with fat must then take the place of eggs, rice, butter, and cream.

## CHAPTER III

### FOOD FOR THE CHILD AT SCHOOL

"Old men bear want of food best; then those that are adults; youths bear it least, most especially children, and of them the most lively are the least capable of enduring it."

— HIPPOCRATES.

THE child is now of school age and goes from the business of eating and sleeping and telling to his companions the wonderful things he has found out, to that of studying things out of books and reciting to others dull facts just as he has learned them. He passes from the freedom of play to the restraint of the desk and chair, from constant out-door life (if he is a fortunate child) to the bad air of the school-room. He is in great danger of injury from these causes even if his food is adapted as perfectly as science permits. But when that is wrong there is little wonder that the pace kills.

At 12 he needs only a little more fat in his food than at six. Whether this is because the growth of fatty tissue is now very slow, or whether the body is best served with the fat made from the carbohydrates, or whether the presence of extra fat interferes with some process — it is a fact, that less fat is present in available form in the tissues, and therefore there is less reserve force available.

The grown man carries several days' rations in his

tissues in the form of fat so that it is no matter of consequence whether he gets full meals on a given day. No organ will suffer by even three or four days' abstinence if the man is in normal condition, but no young animal (note the absence of visible or stored fat in veal, in chicken broilers) carries much reserve, hence the child who goes to school without breakfast becomes exhausted before noon and some brain-cell may suffer by atrophy, or, in order to save the precious legacy, nutrition may be abstracted from muscles already formed and a stunted growth result.

The food of the child at school is then second in importance only to that of the infant, and the parent who neglects this part of his child's bringing up is culpable and his sin will surely be visited upon the third and fourth generations.

This is not the place to go into an exhaustive discussion of the food given at home, for if the general family table is well cared for there will be less danger to the youth of high-school age from what he finds on it than there is in the noon luncheon.

At this period of change and unrest, flavor begins to count for more, and greater pains should be taken to use such natural foods as contain possibilities of flavor. Asparagus, lettuce, celery, etc., owe their popularity and efficiency not to their food values reckoned in calories or protein but to the stimulus to the nerves given by the very small quantity of food accessories. Used with discretion, these are adjuncts worth the excessive price. They may, however, be replaced by cheaper vegetables such as carrots, spinach, onions, or cabbage. For a pound of food value in this form \$1 to \$2 is often paid

instead of 10 to 12 cents for an equivalent in wheat or corn.

The cost of many of these things is now excessive because their real value is not appreciated, and efforts are not directed to producing and preparing them.

The child at school needs to have temptation to indiscriminate eating removed, because modern school life is exciting at best and the food should be such as to quiet rather than excite. The lack of fresh air should be considered in planning the food of the child in the school-room, for such confinement is at best unnatural. What modification of diet may be made to meet such conditions is not yet known. It may be found that it is in response to this artificial life that sugar is demanded by the modern child. Certain it is that sugar may be allowed if it is taken so as not to interfere with the appetite for more substantial food. There is a real reason why sugar and the predigested foods should not form a large proportion of the diet. All food, to be of use, must ultimately be in a condition to pass through the membranes of the digestive tract. It is possible that soluble substances pass through too rapidly and in too great quantity for the immediate need of the tissues.

It is better where a considerable time elapses between meals to have a portion of the meal less quickly diffusible. Therefore, supply starch rather than sugar, bread rather than all meat, but not too difficultly digested food as fried eggs and rich gravies — which require not only time but energy to make available.

Child-study does not yet include a study of the influence of food upon the mental as well as physical growth; it nevertheless may have more definite and

direct bearing than anything else. Over-stimulation is impossible to the child who is properly fed; nervous troubles may be directly traceable to bad digestive conditions. It is only in rare cases that, by accident or malformation, nerves are so crowded or twisted that the currents "short circuit." Irritation may arise from inflamed tissues due to products of indigestion. These products are carried by the blood to every part of the body; and that which is most sensitive is most affected. The child at school needs a quality of food which will give to the blood those substances which the tissues can use, not load it with that which must be rejected. In the effort to reject a strain is put upon some part which, becoming weakened, soon shows by inflammation or by torpidity that it is not doing its work.

If there is any place where penury is dangerous it is in the food of children at school, and especially in the noon lunch of high-school children. The prevailing American habit of intemperance in eating leads to such indulgence by the children that 10 or more cents a day must be spent at a lunch-counter to procure clean, well-prepared food which will satisfy the average pupil. Just as good food could be served for five cents, and if service is practically eliminated, sufficient might be given for three. This extravagance works injury to the most deserving pupils—those from families where even 25 cents a week for each child is not to be thought of aside from the family budget. And so because of this gross feeding of the class which puts pleasure of the senses before future well-being, the child of less fortunate parents, who probably has a better brain, must struggle through his school years without the warm

luncheon which would be so beneficial. Fortunately he sometimes has far better digestion and is able to secure from unpromising materials a sufficiency of nutrition.

The following "penny" lunches were served (1916) at an elementary school in the poorer district of Chicago. No attempt was made to supply a fourth of a day's ration, but each luncheon yields about 200 calories. The price covered the cost of raw food materials but not of service.

#### SERVED FOR ONE CENT

Cocoa with one of the following sandwiches:

- Peanut butter,
- Bologna sausage,
- Salmon,
- Butterine,
- Baked bean.

*Or*

Soup with two slices of bread.

#### SERVED FOR TWO CENTS\*

- I meat ball. Mashed potato and gravy.
- I slice of bread.

The prices paid for the raw food were as follows:

Skim milk, 8 cents per gallon.

Cocoa, 20 cents per lb.

Bread, 2nd day bread obtained from a large bakery,  
freshened and sterilized by reheating in the oven,  
2 cents per loaf.

Butterine, 17 cents per lb.

Peanut butter, 11 cents per lb.

\* 1917. Due to the increase in prices the two cent lunch has been discontinued, as three cents would be needed to cover the cost. The penny lunch is still being served.

The proportions used were as follows:

COCOA FOR 125

Cost \$0.56.

3 gal. skim milk.

3 gal. water.

1 lb. cocoa.

2 lb. sugar.

MEAT BALLS FOR 100

3 lb. hamburg steak.

1 gal. can full of bread crumbs left from previous lunches, soaked in 2 qts. of skim milk.

6 onions.

4 teaspoons salt.

BEEF STEW

Made from flank steak, carrots, turnip, raw potatoes and onions, with rice for thickening. (Potatoes predominate):

SOUP FOR 125

Cost \$0.71.

2½ lbs. Hamburg steak,

Soup greens,

1 lb. rice,

1½ lbs. spaghetti,

2 cans condensed tomatoes,

½ c. salt,

6 gals. water.

Sometimes carrots, turnips, celery, or cabbage (pur-

chased as soup greens — including outside leaves of different vegetables — at 10 cents per peck).

Salmon, baked beans, and bolgona sausage are each mixed with white sauce to make the sandwich filling.

The necessity of attention to the food of school children is becoming recognized, and school authorities are alive to the wisdom of providing fuel for the fires they are kindling.

The school luncheon for high schools or any schools where children are prevented from going to their homes for a 12-o'clock meal may cost, as we have said, from five to ten cents, well served at a counter with the least paraphernalia. If it is to serve in place of the noon meal, as in manual training schools where the session lasts until 3 o'clock, then the pupils should be served at tables with due regard to neatness and order, and with ample time for two courses. The expense of service may be lessened by the pupils buying the served order at a counter and taking it themselves to the table which has been cleaned by a maid. Rightly managed this is successful and reduces the final cost.

This kind of luncheon will cost from 15 to 25 cents. It *need* not cost more than 10 to 20, but taking the average American youth as he is, the higher cost only will satisfy, and if means allowed he would spend more.

A few words as to the character of this luncheon may not be amiss: It must be borne in mind that the child is going back to study, in not too good air — often in very bad air. Therefore not too much blood (energy) must be taken from the brain, and yet circulation is to be promoted so that fresh blood may be brought to the brain-cells before they are too exhausted to benefit by

it. The mental forces are to be gently stimulated and not rendered torpid, as is the case when the child becomes sleepy.

For quickening the circulation, warm fluid is best in many cases, — such as hot milk, soup (if not greasy), and cocoa. Cold fluid, as milk or fruit, is often quite as acceptable.

Vigorous children can take the fluid in the form of water and the solid in the form of bread and butter with or without meat, or in the form of crackers, which appeal to children, and, if well masticated, seem to agree with them even better than ordinary bread. American children will not be satisfied without some sweet, and, right or wrong, they will have it. It may be an effort to offset the unnatural conditions to which they are subjected, to furnish a quick-burning fuel, one which can be used at once and leave no ash behind, one which while giving less energy also requires less energy to convert into useful material. In any case, the liking for sweets must be heeded and that form given which will serve the best; namely, fruit-sugars as far as possible and milk-sugar as soon as it can be bought for 10 cents per pound. All dried fruits — dates, figs, raisins — are most excellent food and should be freely furnished. Gingerbread and cookies may be used for variety, but the most attractive viand on account of flavor, consistency, texture, and temperature will be ice-cream. If properly made, of the best materials and with absolute cleanliness, this is a valuable food, high in actual value per pound. In the warm days of spring and fall it is most refreshing, and the quantity which can be served for 10 cents will not appreciably lower the temperature of the child's

body, especially since he is apt to make the pleasure last as long as possible.

If luncheon is served at table, well-made hash, creamed fish or chicken, well-made stews, eggs, cold meats, baked apples, or light puddings may be added. For a noon luncheon when brain-work is demanded after it, pastry, doughnuts, etc., should be prohibited. They demand too much expenditure of energy by the body.

In winter a nut-cake may not be too hearty for the robust ones who demand strong food, even frosting on the cake may be permissible, if these rich and sweet things are not eaten at all at intervening times so as to affect the appetite. This precious remnant of the instincts of primitive man is worthy of care. A distinguished physician has said, "If life in other respects is normal, this appetite is likely to lead in the right direction." But alas! who leads a normal life? Certainly not the city child for whom we find ourselves constantly planning. Young people should not crave the constant stimulant of variety and condiment. Something is wrong with their bringing-up when they do.

## CHAPTER IV

### FOOD FOR THE ACTIVE YOUTH

"Food is the only source of human power to work or to think."

FOR the type of young person is usually chosen the soldier who may be fed on the compact, hearty food of camp life, provided it is savorily prepared, without so many kinds of dishes at one meal as the city clerk requires, because his sauces are out-of-door life, fresh air, something to do all the time. That is, the soldier in the field, the youth in the logging-camp or on the farm, keeps up the excess of activity begun in childhood, only now it is applied to useful and commercial ends. So long as activity is kept up, food is demanded in greater quantity than at any other time. The purveyor is usually right when he charges for a young teamster double the board which is ample for a seamstress. However, the cost is not necessarily greater for a double amount of food since it may be of less expensive materials than the smaller quantity of more costly food demanded by the whimsical appetite of the sedentary person.

When the youth is at college instead of at military service, how shall his food be graded? His life is one of less activity — unless he is on an athletic team — of more mental exertion, which we believe requires an ample supply of food although the mechanics of thought seem to be more economically carried on than the

mechanics of motion. In both cases ease of work depends largely upon accustomedness to the kind of effort.

In a six-day bicycle race the winner used 4770 calories per day, while the contestant who failed on the fourth day used 4610 and the second in the race 6095, which increase was evidently not put to the best use in developing energy.

In vigorous youth a taste for all natural foods should be cultivated and a power of digestion developed which shall stand him in good stead in after life. It is his one chance, and woe to parent or teacher who destroys it and inflicts life-long misery. This is no vision of a disordered brain. Take a census of any thousand students in any State in the Union and set apart those whose appetite and digestion are normal, who would live on whatever was set before them, and how small a company you would find! — hardly enough for one table.

Most instructive lessons may be learned from the training table of football teams, boat crews, and soldiers on the march as to diet for excessive physical work. We find that the following is a fair statement of the results at hand:

	Protein, grams.	Fat, grams.	Carbo- hydrates, grams.	* Calories.
Average of 7 boat crews .....	155	177	440	4085
One football team .....	181	292	577	5740
United States Army (Garrison *)....	157	99	481	3536
United States Army (Field) .....	113	218	489	4448

\* Havard, Military Hygiene.

The form in which the food is served is to be that to which the men are accustomed, so that they will

eat it. The soldier takes his ration of bread, bacon, beans, or stewed meat and coffee without "frills" of strawberry shortcake, ice-cream, or coffee-jelly which a Harvard boat crew requires. The former might cost 35 cents, the latter 80 cents to \$1.50 per day.

It will be noticed that the increase is in all the factors, not in any one, which fact adds weight to the belief that food is to be taken as a whole, not in separate parts; that the body can select that which it needs and reject the rest. The increased labor of the athlete does not, however, always bring lasting strength, for some one organ is very apt to be over-strained. Few men live to a comfortable old age who have over-exerted themselves in youth.

It is not necessary to quote dietaries in full for this active life. The various army rations\* show what may be done, and the U. S. Government bulletins give many illustrations. As a transition from this chapter to the next there is considered the cost of food for the large number who are workers part of the year and students the rest. It is not possible for them to have the delicate flavors and great variety which are usually associated with a student's table.

Observation of the habits of young people in America, east and west, north and south, leads the author to the conclusion that the use of sapid vegetables in a suitable way is very much neglected, that it is most unfortunate when "I do not like turnip," "I do not eat squash," are heard at every table, that college students avoid green vegetables unless they are disguised in soups or sauces.

\* See Mrs. Melvil Dewey. J. Home Economics, 1916, p. 649.

There are many good ends served by these despised roots and leaves, not the least of which is "stuffing," since the twentieth-century digestive tube is in danger of growing up — contracting to a string — for lack of distending material. The absorbing surface is distributed over many times in extent the nominal area of the tube, and if this surface is crowded together instead of distended by fluid and fibrous mass, absorption cannot so readily take place, even if inflammation does not result.

It has been said that fear of indigestible food is the bugbear of modern life. We might say that the word itself is one of the most misused terms. Most persons consider any substance which requires a long time to go into solution indigestible. Thus smoked meats and legumes remain four or five hours in the stomach undergoing a slow macerating process, and yet may be as completely utilized by the body in the end as sweet-breads and rusks, which leave the stomach in two or three hours.

There is far less danger from cellulose-bearing vegetables than from fat-bearing sauces. Thudichum says, "Cooks should avoid introducing concealed forms of fat into dishes needlessly, as they may prejudice physiological nutrition."

Several educational institutions in the middle West have been known to feed their students on good and sufficient food even for brain-workers at sums varying from 14 to 15 cents per day per person, though to-day this amount would have to be increased about one-half. The students are for the most part country bred and they come to the school for a serious purpose,

willing to endure hardship if need be for the sake of an end in itself, but only a means to the end they seek. One such institution furnished the author with the following bill of fare which will serve as a sample. Vegetables are raised either on the college farm or are purchased cheaply, which is a large part of the secret both of the health of the students and the inexpensiveness of the dietary:

### APPROXIMATE BILL OF FARE

#### MONDAYS AND THURSDAYS

- Breakfast: Warm drink; cereals, oatmeal and graham gems; vegetables and meat (cod-fish balls), bread and butter.
- Dinner: Vegetables, mashed potatoes; meat, beef-steak with gravy; side dish, peas or lima beans; dessert, apple pie, hot corn bread.
- Supper: Bread and butter, graham bread and sirup, sauce (peaches), doughnuts (hot).

#### TUESDAYS AND FRIDAYS

- Breakfast: Warm drink; cereals, oatmeal and graham gems; vegetables and meat; hash, bread and butter.
- Dinner: Soup; vegetables, baked potatoes; meat, bacon, mutton or veal with gravy; dessert, macaroni or canned tomatoes, hot corn bread.
- Supper: Biscuit and butter, white and graham bread, sirup, sauce (apple), cheese.

## WEDNESDAYS AND SATURDAYS

- Breakfast: Warm drink; cereals, oatmeal and graham gems; vegetables and meat; Irish stew; bread and butter.
- Dinner: Vegetables, beans or peas; meat, pork (with the vegetables); side dish, turnips, greens or cabbage; dessert, pudding or tarts, Boston brown bread and sirup.
- Supper: Cold beans or peas, bread and butter, graham bread, sauce (berries), plain cake.

## SUNDAYS

- Breakfast: Warm drink; cereals, fried mush and sirup (or eggs); vegetables, potatoes; meat, fish, gravy; bread and butter.
- Dinner: Vegetables, potatoes; meat, roast meat and gravy; side dish, according to season; dessert, according to season; hot corn bread.
- Supper: Bread and butter, graham bread, plain cake, sauce, cheese.

*Accounts.* — Endeavor to use as much as  $4\frac{1}{4}$  lbs. flour, 1 lb. corn, 1 lb. oats,  $\frac{1}{2}$  lb. beans or peas,  $\frac{1}{4}$  lb. skim-milk cheese, and 1-5 lbs. codfish per person, per week. Use as much more of these articles as you can make acceptable.

Endeavor not to exceed  $2\frac{1}{3}$  lbs. potatoes,  $\frac{1}{2}$  lb. butter,  $\frac{1}{2}$  lb. pork,  $2\frac{1}{4}$  lbs. beef, 1 lb. sugar, 2 eggs per person, per week.

Side dishes like peas and lima beans may be served without extra plates or saucers.

Sirup once a day.

Several other schools are known to the writer where a similar severe restraint is put upon mere appetite for the sake of gaining an education, and hence the confidence with which the assertion on page 38 is made.

There is no intention of recommending so limited a dietary in every case, but it may be of advantage in certain cases to know what is possible without injury to health. A strong appetite is a great safeguard against the dangers arising from intermittent supplies, and is a chief factor in the energy of the pioneer.

#### FOOD SUPPLY PER PERSON PER DAY

	Grams.	Calories.	Calories, per cent.
Protein .....	150.6	618	14
Fat .....	181.2	1626	39
Carbohydrate .....	506.4	2076	47
	838.2	4320	100

#### PERCENTAGE DISTRIBUTION OF THE CALORIES

	Per cent.		Per cent.
Bacon .....	1.8	Lamb.....	5.3
Beef .....	6.7	Milk.....	12.6
Bread and flour .....	13.3	Pork loins.....	1.1
Butter .....	11.2	Potatoes.....	5.9
Cream .....	1.3	Sugar.....	11.6
Eggs .....	2.3	Other items.....	24.5
Fowl .....	1.9		

Contrast with this the results obtained (page 41) from a study\* of the food consumed by the boys in one of the largest private boarding schools in the country.

It is interesting that 12 dietary items yield 75 per cent of the fuel value, and that 181 other varieties yield the remaining 25 per cent. Bread, butter, milk and sugar, together yield 50 per cent of the food fuel.

\* Study made by F. C. Gephart. Record taken from Lusk, "Food Economics."

## CHAPTER V

### FOOD FOR THE YOUTH AT COLLEGE AND FOR THE BRAIN-WORKER

"The digestibility of a food is of far greater concern to a brain-worker than its chemical composition." — HUTCHISON.

WHILE it is true that food must be considered as a whole and not separated into constituents for one organ over another, yet there are certain broad generalizations derived from ages of experience and years of scientific observation which should serve as guides to our limited knowledge in diet.

The horse, when called upon to do heavy draught work, which requires steady pulling under direction, is apt to be fed with corn and hay; while the spirited roadster or hunter, which is called upon to have his wits about him and to use reserve force suddenly, has oats with little hay and corn.

The man in a logging-camp at hard work in the open air at a low temperature finds pork, beans, and pan bread or biscuit none too satisfying and sustaining, while the student sitting in an over-heated room with only a short walk three times a day, often at a slow pace, well muffled up, would be unable to digest a quarter of the lumberman's diet, and finds himself clearer of brain with eggs, toast, and coffee for breakfast, and chicken and rice for dinner.

The obvious lesson to be learned is that muscular

exercise, while it uses protein and fat, uses by preference more carbohydrate when it is available than mental exercise appears to demand.. It is true that the body needs to have muscular exercise in order to keep its charge — the brain — active, but above that, it does seem as if the brain requires more fat and nitrogen in proportion. The system must, as was said, be kept up in good condition and then — so economical is the body — a very little excess of “brain food” supplies the need; but it is a waste to manufacture it out of substances from which it is obtained only at the expense of many by-products, or at the expense of much digestive force.

Above all else, the brain-worker needs a “clear head,” that is one in good working condition. This demands blood circulating freely, rich enough in oxygen to keep all the cells of the body at their maximum vitality, and with dissolved nutritive substances sufficient for the needs of repair and nourishment. There must be absent, moreover, all traces of imperfect decomposition in the circulating fluid which will tend to irritate, inflame, or clog the minute blood vessels.

The food may be anything which serves the proper purpose of food, provided it is properly prepared. The brain-worker is subjected to the great disadvantage of bad air and lack of exercise. This leads to a loss of appetite, which is then stimulated by additions of strong flavors and by attractive serving. He seems, of all men, the last to see the true remedy for lack of strong appetite. . If he must continue to work in close air and with little activity, then take a lesson from the chick in the shell and let him eat a limited quantity of the

most easily digested nitrogenous food, with a somewhat larger proportion of fat in relation to carbohydrate than would be needed for severe muscular exercise.

Therefore, while the food for the brain-worker should belong to the class easily digested, it should not be too concentrated or be predigested so that a large amount is at once available in the blood current. For in a short time there is a lack of available food which results in exhaustion and possibly in an overstepping of the elastic limit of recovery.

The temptation is great to use, according to the directions, the various proprietary foods found in the market. The busy student does not seem to grasp the idea that food for his body and brain must pass through several transformations by means of the already present cells before it can nourish new ones. He seems to consider it sufficient to pour in prepared milks, cereals, etc., just to fill the void. Mental energy he seems to hold as heaven-given without the intervention of earth forces.

To the man whose brain is his capital, the loss of an hour of thinking-power may mean thousands of dollars, yet in 99 cases out of 100 such a man will eat a meal which will inevitably weaken his power of thought and possibly change the future of a town or county.

Unbelief — “no matter what a man eats” — is his bane, and when he breaks down at 50 it is said to be because he applied himself too closely — never because he was foolish in his diet.

The contrary picture is even more pitiable; a fine mind the prey of morbid fear lest the food should not

suit. This condition often follows a breakdown and is a result of previous neglect of the most obvious laws of health. It sometimes seems as if the more delicately organized the mind, the greater danger there is of fixing it upon its own condition. For this reason, if for no other, right habits should be acquired in youth before the danger of morbid mental processes is so great. For this reason, also, there should be restaurants where the business man and scholar will not be tempted to swallow food sure to use up mental energy. His home table should be laid with strength-giving and not strength sapping viands, so that the evil may be reduced to a minimum.

But all this care costs too much money and means too much time given to it! Not at all, if skill and judgment are used. Because the flavor of mushrooms adds to the relish of the steak it is not necessary to buy a pound of fresh mushrooms at \$1.00 the pound. Because, on a given occasion, an author has written a particularly brilliant paragraph after eating a dish of sweetbreads there is no cause for furnishing a like dish every day.

Students going up for examination, business men with decisions of large import to make, professional men with great interests at stake, all require the full, available amount of nervous energy, and the food taken for at least 24 hours before should be that which will give this energy. In each case it may be different. Eggs for one, bacon for another, rare beef-steak for a third, while a fourth may have such a bank of health to draw upon that rolls and coffee with a banana or other fruit may put him in the best condi-

tion. The usual American breakfast of all kinds of flesh, fish, or fowl with vegetables and hot bread, never fits a man for his best work.

The author has expressed elsewhere, and more than once, the view that it is the imperative duty of the college and university to take in hand the matter of food for the future leaders of the nation, as an example of what education really stands for if for no other reason.

If Dr. Johnson was right in his statement that "women can spin very well, but they cannot make a good book on cookery," it behooves the university man to follow the example of the eighteenth-century savant and turn his attention to the transmutation of the dross of the market into the fine gold of the highest human endeavor.

The unexpected is relished in food as in pleasure by those who are sensitive mentally to tastes and appearances. A surprise is welcome even if it is a simple affair. This means only foresight on the part of the provider, and care taken not to exhaust all combinations by too lavish a display.

Happy is the man who is so well balanced that he takes his breakfast, as his newspaper, as a matter of course, and who is no more ruffled by the fraction of variation in the stiffness of his boiled egg than by the rumour of an Indian outbreak. Happy is he who sits down to the dinner provided for him without thought of what he must leave out, with a mind free for social pleasure, secure in the skill and knowledge of his cook.

What, then, shall the brain-worker eat? A little of anything which his system can appropriate. His table need not be different from that of other men in appearance. A few things may well be omitted, as rich gravies,

sauces, patties, or highly seasoned entrees. Otherwise a liberal diet of a few well-cooked and well-seasoned dishes at any one meal should give mental vigor.

Of great value to the man who lives much indoors are frequent outings of two or three days when all the cobwebs may be blown away and all the capillaries flushed out by ocean breezes or mountain blasts. The stimulus of change, even if the food is only moderately good, is invaluable. Length of time is of less importance than completeness of change.

The joy of living — who would not have it? — and yet how few are willing to pay the price of it! A little thought, a little self-control, and then forget that there is such a thing as digestion. Thrice blessed the man whose body is such a perfect machine that he is not conscious of it — only in such case is he a whole man.

Just as a suggestion, we may say here that, for the family table 50 cents a day per person for raw food material is ample; 40 cents should suffice, and with "a \$5,000 wife,"\* the brain-worker will thrive on 30 cents per day. (See pages 106 to 125.)

\* At the Columbian Exposition in 1893 a gentleman was heard to say, on leaving the "Workman's Cottage" with its family living on \$500 a year, "It will take a \$5,000 wife to do it."

## CHAPTER VI

### FOOD FOR THE TRAVELLER AND FOR THE PROFESSIONAL PERSON

"For they can conquer who believe they can."

THE man who has an aim in life is ready to forego certain indulgences which his companions with no thought of the future provide for themselves. He may refrain from smoking or from theatre-going, from the social affairs which would cost either money or time. He does this in order that he may be a great writer, philosopher, or that he may make a name for himself as an engineer or a business man. The one thing he does not take into account is the quality of the food he eats and its effect upon his prospects. He may consider its cost and deny himself a sufficient supply, but at the present day, as a rule, the danger is in the poor quality rather than in the quantity. For lack of knowledge of the fundamental position of the digestive system in the human economy, the majority of persons subject it to a strain impossible for it to bear with safety, and then blame every other condition for the results.

From the necessity of the case, the traveller is surrounded with stimulating sights and sounds, whether agreeable or otherwise, giving the nervous system extra labor, and therefore making it a duty to supply it with nutrition. This stimulation has a very beneficial effect upon those who have fallen into self-pitying ways and

whose digestion has been impaired by too much coddling. But the temptation to eat, when one has nothing else to do, a variety of dishes badly cooked and indifferently served, is too great for many persons to resist. The lawyer who has to make a plea for his client, the engineer who has to examine a bridge, the pleasure-seeker with a long journey before him cannot afford to arrive at his destination with mental or physical power in the least impaired, in a depressed instead of a refreshed condition. The most important factor of the many contributing to the favorable or unfavorable result of a journey is the food taken on the way. "Just for once it will not matter." If tainted meat disguised with juicy sauces and French names is eaten, or if a jumble of canned lobster, re-frozen ice-cream and puff paste is hastily swallowed at a 20-minutes-for-lunch counter, a sick headache may warn the rash traveller or acute indigestion may follow. More probably the viands will not show their vicious character so actively, but will simply cause heaviness, loss of sleep, general irritation producing such a condition of the system that disease finds a weak defence at a time when it should be met with strong resistance. Travelling has been made safe and comfortable beyond anticipation in nearly all points; good air and proper food are still wanting.

Since the body is not making any exertion, it needs not the foods which furnish bodily energy and repair waste, except in so far as the involuntary work goes on: there is required less than half the usual amount of food. If, in travel, a person can store up energy for the future strain as a person is fed in a hospital before an operation, it is safe to take more food, but this storing demands

the right materials and that measure of good air which the railroad train does not give, although the steamer may. This is a difference between the two modes of travel which seems not to have been considered by either caterer or eater. Less meat in made dishes, less pastry, less Worcestershire sauce, and more good fruit and well-cooked vegetables would conduce to the health of the railway traveller. Crusty rolls, fresh butter, cookies, for those who like sweets — cake, even, is far safer for the occupant of a heated car than the usual bill of fare. The dining-car has provided most carefully for good water; let it now provide safe milk and delicate, digestible dishes. It is certain that it will do so whenever the public is wise enough to demand such a table. As it is, the traveller who wishes to reach his journey's end in prime condition omits two-thirds the bill of fare.

The professional man or woman — teacher, nurse, doctor — who has little outdoor exercise needs to observe a similar caution in every-day life, the balance between health of mind and of body is very easily put out of order, and it should not be as difficult as it is to secure. At present the way of the transgressor is easy. A dish of blueberries and so-called cream costs 20 cents, a piece of blueberry pie containing three times the food value, requiring five times the labor to prepare, costs 10 cents. Two doughnuts cost five cents, while rolls and butter cost 10, and bread and milk with half the food value costs 15. What a revolution the simple adjustment of price of food to value would cause!

In one's own home the case is little better unless the mistress understands how to keep the golden mean between the appetite and the need of the body. To a

great extent each person is a law unto himself, but when a dull, sleepy, or headachy afternoon is sure to follow the partaking of a certain lunch, why continue to take that lunch? "She tempted me and I did eat." How many a man could say it with perfect truth to-day. When shall the lesson of the proverb, "A man is what he eats," be thoroughly learned?

Is life worth living? Then let us learn to make the most of it, for half its cost may be the cost of the food to sustain it.

It is the *belief* in the potency of natural causes to bring man to his full estate, and an ambition to reach that estate that is demanded. Every person must make his choice, not only as to a profession and his place in it, but as to how much he is willing to pay for it.

#### THE BUSINESS MAN'S LUNCHEON

A tour of down-town lunch places at the noon hour reveals two sharply-defined classes of patrons: (1) those who believe in steak and chops as best brain-and nerve-food, and can afford a dollar or a dollar and a half luncheon; (2) those who believe in staying the pangs of hunger for the least money. The latter pay 10 cents for a piece of pie and some cheese with a glass of milk, or a cup of coffee at five cents more, and get just as much nutritive value as the other — provided the body can assimilate it in that form (see page 53).

If the luncheon is to serve as dinner, double its value in both cases may be put upon it.

Habit is, alas, all-powerful, and the man with great business interests at stake, which he must consider at

his desk, will continue to rush out for his quick and hasty luncheon just as he did five or 10 years before when, as a subordinate, he was on the street half the morning going from one business building to another, to the wharves, to the custom-house, etc. Very few men seem to adapt their habits to their condition. Again and again I must say it, it is because of their disbelief in the effect of food on their physical condition and on their careers.

	Protein, grams.	Fat, grams.	Carbo- hydrate, grams.	Calories.
Chop.....	15	20	.....	247.5
Potatoes.....	2.1	0.1	17.7	82
Salad.....	0.5	1.6	1.4	23
Orange-ice.....	.....	.....	12	49
	17.6	21.7	31.1	401
$\frac{1}{4}$ mince pie.....	6	15	66	436
$\frac{1}{2}$ oz. cheese.....	3.5	4.1	0.3	53.7
$\frac{1}{2}$ pint milk.....	8.3	10	12.5	178
	17.8	29.1	78.8	668

### THE SHOPPER'S LUNCHEON

The majority of women who throng the stores may also be divided into two classes: (1) the careful housewife with a long list, who is appalled at the prices of the restaurant and who tries to finish her day of unaccustomed exercise on a slice of toast and a cup of tea, or takes chocolate éclairs or a small ice-cream, with the possible consequence of a raging headache, blunted judgment, and unsatisfactory purchases; (2) the woman who boards and who means to eat something she likes

or something new, and who does not mind the time it takes. She comes down town nearly every day, and she does not travel half the city over, in one day, as does the first woman, she saunters slowly along one street or two at most. Her luncheon consists of a medley of croquettes, salads, and sweets which could never agree; dishes dressed over so that the original ingredients may never be revealed, and she pays 50 to 75 cents for the next day in bed, or perhaps a physician, and her family pay in unhappiness.

Until one makes a business of visiting the popular restaurants of any city, one does not realize what a force these restaurants are in the forming and fixing of food habits. Many attempts have been made to provide hygienic luncheons, but the number of those willing to reform at the expense of a little time and thought has been too small at any one point to sustain such an establishment. Lately, however, certain experiments are proving by their success, a changed attitude on the part of the public. Often, the only persons who have interest enough in the problem are those cranks who believe a single article of diet, or a peculiar way of cooking, is all-sufficient. In every city there may be found, in out-of-the-way places, "eating-houses" presided over by some motherly soul where really good food may be had under plain old-fashioned names; where one need not fear to eat of any dish on the bill of fare; where below stairs it is as clean as the visible portion and where 25 or 30 cents will procure a good meal.

A restaurant established by the Bureau of Public Health, in the Health Department building, New York

City, has undertaken to describe on its bill of fare the nutritive character of each dish served. Each day two different luncheons are also offered, each furnishing practically the same food value but differing in price. The following were offered for one day:

## Low Cost — BALANCED RATION

	Price.	Quantity.	Calo- ries.	Pro- tein, grams.
Tomato soup.....	\$0.05	½ pint	130	3.0
Macaroni, baked with cheese....	0.05	3 heaping tablespoons	350	16.5
Ice-cream.....	0.05	2 heaping tablespoons	270	6.0
Whole wheat bread.....	....	.....	140	5.5
Butter .....	....	½ ounce	110	....
	\$0.15		1000	31.0

## HIGH COST — BALANCED RATION

	Price.	Quantity.	Calo- ries.	Pro- tein, grams.
Tomato soup.....	\$0.05	½ pint	130	3.0
Potted roast.....	0.20	3½ ounces	250	20.0
Creamed spinach with egg.....	0.05	2 heaping tablespoons	55	2.0
Gingerbread.....	0.04	2 ounces	220	3.5
Coffee.....	0.04	1 cup	....	....
Whole wheat bread.....	....	2 slices	140	5.5
Butter.....	....	½ ounce	110	....
	\$0.38		905	34.0

In 1915 a study was made of the cost of ready to serve food in a chain of New York restaurants. The following menus were selected from the bill of fare at different costs, each yielding nearly the same food value, sufficient for a sedentary man of average weight.

It must be remembered that these are sale prices and include the cost of preparation and service, as well as business profits.

On the other hand, the actual cost of the raw food material when bought at retail is far greater than when purchased at wholesale in such large amounts as in this case.

**Breakfast:**

	Cost.	Calories.
Coffee (with milk and sugar).....	\$0.05	195
Hot corn muffins.....	0.05	453

**Lunch:**

Roast beef sandwich and roll.....	0.05	357
Crullers.....	0.05	444

**Dinner:**

Vienna roast, fried potatoes, bread and butter.....	0.15	834
Cocoanut pie.....	0.05	372
	<hr/>	<hr/>
	\$0.40	2655

**Breakfast:**

Coffee (with milk and sugar).....	\$0.05	195
Chipped beef and scrambled eggs.....	0.20	728

**Lunch:**

Roast beef cutlet, tomato sauce, fried potatoes, bread and butter.....	0.15	738
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**Dinner:**

Lamb croquettes and mashed potatoes, bread and butter.....	0.15	874
Apple pie.....	0.05	177
	<hr/>	<hr/>
	\$0.60	2712

### BACHELOR BOARDING

I have elsewhere estimated that 25 per cent of the family income was a sufficient proportion to pay for raw food material exclusive of preparation and serving. For an income of \$1200 a year this would mean \$300 for food for a family of three or four, including occasional guests.

The young man with a salary of \$1200 is apt to pay \$5 or \$6 a week for his table-board, \$300, and lunches and suppers beside to the extent of \$150. Now, then, can he consider matrimony and the support of a family? He rightly feels that he must live well in order to do his work well, and he does not know how to do it for less, and no one is solving the problem for him. If he marries, his wife has only the same bachelor experience to go upon and can only double the expense. What wonder that it is a current saying among men, "Oh, I can't marry until I have \$3000 a year." A fine commentary, this, on the intelligence and thrift of American youth, and a good and sufficient reason for the decrease of native population!

A word to the thoughtful should be sufficient. An adequate discussion of the bearing of these facts would lead us too far afield.

## CHAPTER VII

### FOOD FOR THOSE IN PENAL AND PAUPER INSTITUTIONS

"Deficient diet, like all morbid conditions, both corporeal and mental, is a vitiating and degenerating influence."

— KING CHAMBERS.

THOSE unfortunate individuals who are kept at the expense of the State may be conveniently divided into two general classes.

1. The potential citizen, as pauper children who may grow up into men and women returning to the State full value; criminal youth who may be brought into better ways and so repay the care and trouble; and the sick poor, who also come under this class.
2. The pauper past work, the hopelessly insane, and the vicious.

The food for the latter class may be dismissed with few words. While the State undertakes to care for them, it must not starve them nor give them such food as to cause diseased conditions. This latter is self-evident, because a sick person costs more to care for than a well one. But there is no obligation to give them more than that quantity and quality which will serve the ends of existence. They have forfeited any rights to pampering. Hence it is that when a subsistence ration is to be studied, scientific men all over the world go to these institutions for data. There are

several other reasons why conclusions are more valuable in such cases. The inmates have little chance of getting food from outside. They are usually under the eye of the physician. The raw food material is of standard quality, of which the analyses are more numerous, and therefore more to be relied upon. It is limited in variety, purchased by contract, and the amounts served are more definitely known. This is in cases where there is no fraud, and where the cooking is skilfully and conscientiously done — which is, alas, not always the case.

In one institution, of the first class, no longer in existence, several hundred children from six to 14 years were fed at a cost of 9.5 cents with sufficient good raw material which was spoiled in the cooking, — insufficiently stewed beans, which caused diarrhoea in many cases, sour bread, etc. Their blotched, pinched faces, and stunted bodies were pitiful to behold. It were better that they should have been put out of the way like superfluous kittens than that they, through no fault of theirs, should be kept alive to be no credit to themselves or to the State.

The inexpensive foods require the most skill in cooking, and if such an institution will not pay its cooks well, it should allow more rations to make up for those that are spoiled. For 300 persons fed, a difference of five cents a day in cost of raw materials means over \$5,000 per year. It will pay any institution to spend \$1,000 in salaries to save this amount, and yet to secure more palatable and more nutritious food, which can be done so readily with sufficient knowledge.

The same is true of these children and young people

as of more favored ones, that any injury from wrong nutrition affects the whole after-life and lessens the chance of their growing up to be respectable citizens. So fully is this understood abroad that several foreign countries see to it that school children are fed at State expense rather than run the risk of having to care for them later as vicious or incompetent persons.

From 11 to 13 cents\* a day should serve for those of whom the world has nothing more to hope; while for the others 17 cents may be allowed for the older and 15 for the younger ones, rather than a mean of 16 for all.

Sharp separation of the inmates into groups is thus called for in feeding, however undesirable it may be from certain other ethical standpoints.

For young children maintained as city or charitable charges, soup may take the place of milk to a certain extent, since a sufficient milk diet will cost more than the allowance generally made. Soup made with barley and beans, with bread, may be substituted at one or two meals for bread and milk and may be so made as to furnish proper food value. If used commonly, some of the soup should contain milk. Of course tea and coffee are not to be thought of. Cocoa is too expensive, although a flavor of it in hot milk is much to be preferred to the day-long decoction of shells so popular with institution cooks. Gingerbread or cookies, both hard and soft, with much of the sugar outside, may be used. If possible, some rice well cooked, not mushy, but with separate grains, should take the place of much potato. Rice-milk may be used. One pound of rice contains 79

\* These figures apply only where food can be bought at wholesale.

per cent starch and yields 1591 calories at a cost of 8 to 10 cents.

One pound of potatoes as purchased contains 14.7 per cent carbohydrate and yields 302 calories. The edible portion contains 18.4 per cent carbohydrate and yields 378 calories at a cost of about five cents. It requires about five pounds of potatoes as bought to give the fuel value of one pound of rice.

Potato puree and stale rolls rubbed up as a milk puree make an acceptable variety. The Germans use veal as soup-stock much more than we do, and insist that suitable veal is much more digestible than beef, which is rarely used in their dietaries for children.

Cooked fruit in some form and green vegetables should always be used.

The following diet list in use in a parental school will serve as an excellent illustration, although somewhat more expensive than is often required, on account of the large number of underfed children in this particular instance.

### *Monday*

- Breakfast: Oatmeal, fruit, bread, butter and milk, or cocoa.
- Dinner: Pork and beans, bread and butter pudding, milk.
- Supper: Baked potatoes, bread and milk, cream gravy or stock fruit, butter.

### *Tuesday*

- Breakfast: Oatmeal, fruit, bread, cocoa.
- Dinner: Beef stew, macaroni, bread, cold slaw.
- Supper: Gingerbread, baked apple, bread, milk.

*Wednesday*

- Breakfast: Cream of wheat, fruit, bread and milk.  
 Dinner: Lamb stew (potatoes, onion and carrots),  
         bread and bread pudding, milk.  
 Supper: Doughnuts, stewed apples, bread and cocoa,  
         or cinnamon rolls.

*Thursday*

- Breakfast: Oatmeal, mush, fruit, bread and hot milk  
           or cocoa.  
 Dinner: Pork sausage and gravy, bread, potatoes  
         and cooked apples, milk.  
 Supper: Hot biscuit, sirup, rice, bread and milk,  
         butter.

*Friday*

- Breakfast: Oatmeal, fruit, bread, cocoa.  
 Dinner: Macaroni and cheese, creamed potatoes,  
         bread and light custard, milk.  
 Supper: Baked sweet potatoes, bread and fruit,  
         butter, cocoa.

*Saturday*

- Breakfast: Cream of wheat, fruit, bread and milk.  
 Dinner: Beef stew, potatoes, celery, bread and  
         tapioca, milk.  
 Supper: Bread, rice and milk, cocoa and fruit.

*Sunday*

- Breakfast: Wheat, boiled eggs, fruit, bread and cocoa  
           or hot milk.  
 Dinner: Lamb stew with rice, mashed potatoes, raw  
         sliced onions, bread pudding, milk.  
 Supper: Bread and milk, stewed fruit.

When possible fresh jam was made of fruit on hand, and served with crackers or toast and milk.

Children are given all of the milk, bread and butter that they wish at each meal.

The fruit and vegetables are varied according to season.

The following bill of fare for an orphan asylum may also be suggestive.

*Sunday*

Breakfast: Liver, bread, coffee or tea.

Dinner: Corned beef, stewed fruit, hominy, and dessert.

Supper: Bread, gingerbread, tea or milk.

*Monday*

Breakfast: Sausage, bread, coffee or tea.

Dinner: Roast beef, rice, potatoes, and gravy.

Supper: Biscuit, butter, tea or milk.

*Tuesday*

Breakfast: Oatmeal, bread, coffee or tea.

Dinner: Hash, slaw, potatoes, and gravy.

Supper: Bread, molasses, tea or milk.

*Wednesday*

Breakfast: Scrapple, bread, butter, and coffee.

Dinner: Pork, beans, potatoes, and dessert.

Supper: Bread, butter, tea or milk.

*Thursday*

Breakfast: Gravy, bread, butter, and coffee.

Dinner: Brunswick stew, slaw, and potatoes.

Supper: Apple butter, bread, tea or milk.

*Friday*

- Breakfast: Oatmeal, butter, bread, and coffee.  
Dinner: Roast beef, hominy, potatoes, and gravy.  
Supper: Bread, butter, milk or tea.

*Saturday*

- Breakfast: Bread, butter, coffee or tea.  
Dinner: Ham, cabbage or turnip, and potatoes.  
Supper: Apple butter, bread, tea or milk.

## INSPECTION OF AN INSTITUTION AS TO FOOD-SUPPLY

1. If for well persons, note appearance of inmates: character of flesh (solid and muscular or flabby); color, if normal; complexion, if clear and normal, or blotched and "broken out" on lips, ears, or eyes. Note eyes, if clear and alert, or dull and heavy; note movements, if full and vigorous, or languid; watch a meal to see if the food is relished or rejected. If complaints, see what they are. If a hospital, the condition of the patients is not so good a guide, except as to relish and gain in condition. This is difficult to get at, and considerable diplomacy is often needed to accomplish anything like a fair judgment.

2. Inspect the kitchen just *before* the food is served. Do this for the three meals, and stay during the serving and note what comes away uneaten.

- Points: (a) thorough cooking;  
(b) cleanly condition of utensils;  
(c) attractive serving (hot or cold);  
(d) note indigestible gravies or sauces;  
(e) " quantity; is it sufficient?  
(f) " method of cooking.

3. Larder and storehouse: note quality and cleanliness, especially variety.
4. Personnel: are the employees interested to do the best they know how? Are they intelligent? Are they teachable?
5. Cost: is it excessive? Can equally nutritious and attractive fare be served for less money?

BUDGET ALLOWANCE FOR FOOD — PUBLIC INSTITUTIONS,  
NEW YORK CITY, 1915

	Per diem.
Employees.....	\$0.35
Patients (General Hospital).....	0.20
Children.....	0.23
Inmates (Poor Farm).....	0.13
Lodgers (Municipal Lodging House).....	0.03
T. B. Patients.....	0.32

## CHAPTER VIII

### FOOD FOR THE PERSON IN A HOSPITAL

"Just as metal has to be extracted from the ore before it is any use, so by the process of digestion the nutritive constituents have to be extracted from a food before they can be absorbed."

—MALY.

"The careful preparation of food is now recognized to be of vital importance to an invalid and a valuable assistance, in many cases, to the physician in hastening the recovery of a patient."

—HELENA V. SACHSE.

WHILE we may blame a well man for setting his appetite above his intellectual or business interests, we are obliged to humor a sick man as far as his physical welfare will permit.

The nutritive constituents are extracted from ordinary food only when it is mingled with and saturated by the digestive juices sent out from the various glands in response to the stimulus of odor, flavor, and texture, real or imagined. If the juices do not flow, then the food remains inert and no real "feeding" can take place. Predigested foods are offered in this emergency, but belong to the dispensary rather than to the kitchen.

It is to most persons a shock and an excitement to find themselves in such an unaccustomed place as a hospital and with so many other people, and the first point to be gained is to make them comfortable and contented; the second, to give them suitable food, presented in such a way that they will relish it. The

"relish" goes a long way toward making the food "suitable." A contented frame of mind and faith in the nurse and in what she brings increases the secretions and relaxes the nervous tension, so that the energy of the body may be given to digesting and assimilating the food.

Therefore, before considering *what* to give the patients a few words on how to serve it are appropriate:

First, that food which is served hot should *be hot* and not lukewarm; that which is to be cold should *be cold*. If the hospital appliances are not favorable to this, then they must be so arranged as to admit of it before any success can be hoped for.

*Too large* portions should not be given at once, as an appetite for more will tend to cause the patient to thoroughly digest what is taken; and it must always be borne in mind that it is not what is *eaten* but what is *assimilated* that nourishes the body, and it is more important to bear this in mind in a hospital than anywhere else, since exercise and distracting occupation are wanting and the action of the system is apt to be sluggish.

Novelty in food does not commend itself to people who have had little variety in their lives; they relish best that to which they have been accustomed. Neatness and attractiveness go a long way toward making food palatable; therefore, this aid should be used as far as possible, especially since ways of serving can be varied more readily than the articles of diet. A few pretty dishes to carry to those to whom food in thick crockery would be utterly repellent serve to distract attention from the act of eating. Even if there are only a few

such dishes in the ward, it will be an occupation for the patient to guess to whom they will be given at any particular meal.

Of course, this takes time and thought, and a hospital nurse is often overworked; yet, if she realizes the great importance of this part of the means used for recovery, she will find time for it. She will soon learn to whom it will make a difference and to whom it is a waste of time to offer such attentions. The modern hospital has a dietitian whose sole duty is to supply the proper combinations of food for the various patients.

#### DIET IN GENERAL

Surgical patients and those who are simply to be "fed well" should have good and sufficient food, and that which is easily digested. Since they are no longer at work in the open air, even strong men should not be fed upon fried pork and heavy dumplings, but they miss the accustomed flavor of hearty food, and bacon may be given occasionally, and twice a day, meat or fish of some kind with potato, bread, and butter, and as many fresh vegetables as possible. These four articles — meat, potato, bread, and butter — make up the diet of a large part of hospital patients in the common wards. In their own homes they are not accustomed to soups, and it is a part of their education while they are in the hospital to teach them the value of food so prepared. If they find themselves comfortable and growing stronger on such diet, they will believe in it. No better school of diet could be found than an intelligently managed hospital. Even though the patient stays but a week or

ten days, he should have gained something which will benefit him in his after life, for cleanliness and diet must always be insisted upon. It is, therefore, of the utmost importance that the nurses should be as perfectly trained in the serving of food and in the general principles of diet as in any other portion of their duties, for no medicine or disinfection can take the place of nutritious food as a factor in recovery.

Instead of combating the whims of patients or yielding weakly to them, a knowledge of what is best in general practice, and experience of how to "administer" food, should be shared by house officers and nurses. There are at least five requirements.

First. Production of good flavor and odor. Here again is the difficulty of dealing with a *mass* of people, for while garlic is dear to one man's soul; another loathes it. Certain carefully prepared combinations must be decided upon, and in special cases the coveted flavor added after the food reaches the wards. The success of certain of the New England Kitchen dishes shows that this is possible, though only after careful study and experiment. All strong odors should be avoided — those which may reach from one bed to another. Irritating spices, such as solid particles of pepper, cloves, etc., should not be used in food for the wards.

Second. Each article should be prepared in such a way as to make little tax upon the digestive system, because digestion uses up energy which should go to recuperation. This is a most important point. The human body can at best produce only a limited amount of energy, and if an undue portion of this is consumed in preparing the food taken for absorption, there is less

left for the process of repair which, in the hospital, uses the surplus otherwise given to work. This surplus energy is small at most, probably only about one-third the total of which the body at its best is capable of producing.

Third. If a food properly prepared from cheap material can replace an expensive one, it should be used, since more people can have the benefit of care when the expense per capita is low in any public institution, and since principles of sound economy should rule in the use of trust funds.

Fourth. As a rule, it is the heat-giving and energy-giving food which is most required, with that which spares the precious albuminous tissue, rather than so much albumen as is often given. In some cases of loss of blood or lack of flesh, rapid utilization of nitrogen is desirable, and then eggs and steak may be needed as a process of stuffing. This is more or less dangerous on account of the extra work given to such organs as the kidneys, and the production of heat and energy in this way is wasteful compared with that produced by legitimate foods.

Fifth. Soups, broths, fruit soups, sweetened drinks, which are ninety-five to ninety-eight per cent of water; fruits, jellies, and porridge, which are eighty to ninety per cent water, should form the main diet of many hospital patients for several reasons:

(a) Each mouthful contains so little food that it can be readily mixed with the natural juices before more is taken, and so the nutrition in the first spoonful may penetrate to the finger-ends and encourage and stimulate the nerves to call for more even before the last

spoonful is taken. This is often the secret of increasing a patient's appetite.

(b) The heat imparted to the contents of the stomach, while it is not sufficient to affect the whole body to any great degree, is stimulating to digestion.

(c) In most cases recovery is hastened by the rapid removal of the accumulation of waste material. For this the blood must be dilute in order to take up more substances in its passage. If it is a saturated solution it cannot do this.

(d) The more or less feeble and sluggish cells cannot take as much nourishment at a time as active ones do, and the solution by which they are surrounded should be dilute.

(e) To keep up the water lost by evaporation and otherwise, and to furnish enough so that there will be an excess available for *sufficient evaporation* to keep the surface cool, this is often the best antipyretic.

(f) It is often easier to administer nourishment in liquid form.

#### HOUSE-DIET OR NORMAL DIET

The foregoing will enable us to consider a bill of fare for the house in general. Since economy is imperative, as many of the dishes as possible should be cooked in bulk, enough for the whole house, leaving the extras to be given for each of the five tables usual in a hospital, *of which the patients' is the most important.*

The officers' table needs both easily digested and hearty food, since hard work, long hours, and anxiety are making a drain upon the system, while coolness and nerve are essential; therefore food should not be

irritating or indigestible. The nurses' table must meet the same requirements. The employees, on the other hand, have hard work and should have hearty food and that which will stand by, but it must be consistent with strict economy.

Next in importance to the full house-diet, "normal diet," is the *convalescent diet*, for those who are sufficiently recovered from acute disease to take normal diet with the elimination of the hearty dishes, but who are not able to take full quantity. This should be made up from such dishes on the list for the day as can be taken from the normal diet and supplemented from the special list which is posted daily as prepared. It must be borne in mind by both house officers and nurses that a *separate order means increased cost*, not so much in the article of food ordered, but in the time of the high-class service needed to prepare it properly, and in the interruption of the general movement of the service.

In hospitals the cost of food is a most important part of the total expense, and it should be most carefully regulated. That is, for the patients to whom food is life and for whom aversion to food means death, no expense should be grudged. Cream, eggs, beef-juice, chops, anything really needful should be supplied, but for those patients to whom corned beef and cabbage represent luxury, it is not necessary to stimulate an artificial appetite. Neither is it necessary that the strong and hearty attendant should have the fruit and delicacies given to paying private patients. There is a lack of moral sense in the community which permits the use of trust funds for very different purposes from those for which they were devised.

When one recalls the early struggles and self-denial of the man or woman who has left \$10,000 or \$50,000 to aid in the relief of suffering humanity, it is not with entire equanimity that the expert called in to examine the dietary finds that 23.6 oz. of meat, 37 oz. milk, 20 oz. potatoes, 2.6 oz. butter and 5 oz. of sugar are on record as being purchased which, with other things, bring up the cost to 60 cents or over; nearly twice the amount and cost needful.

New England thrift is passing with the disappearance of the careful housewife, and a great impatience of any restraint in food is evident on all sides. So that authorities cannot be held especially blameworthy for an increase in the cost of carrying on this side of the work, any more than they may be justly criticised for spending thousands for modern surgical equipment; one room to-day costs as much as a whole hospital fifty years ago. What authorities should do is to put the same grade of intelligence at work on the food side as on the medical and surgical side, and to be sure that a fair equivalent is obtained for the trust funds expended. In the above case, it is quite impossible that such large amounts, together with the other very liberal supplies, could have been eaten with safety by the inmates, some of whom would have been made ill by half the quantities. All large establishments have leaks which need constant attention.

There is one feature of modern hospital development which demands careful consideration. While we are crowding well people in great numbers into hotels and apartment-houses, while larger restaurants and dining-rooms are increasing, the successful treatment of the

sick and insane is demanding more and more isolation in small groups and even individual service. This is far more expensive, since the waste is necessarily greater and since the individual likes are catered to to a greater extent. Again, pay-wards and cottages are now connected with nearly all institutions, and in these, patients demand the same sort of food as that to which they have been accustomed. This fact, probably more than any other, has led to the increased cost of food. If it seemed necessary to employ a chef to cook for these, why should not nurses and house doctors have the same quality? When one sees and handles tempting food, one feels aggrieved if forbidden to taste. Hence it is not unnatural that employees should use the top of the eight-quart can of milk for their own coffee, or take toll of the fruit and delicacies going past them. Unless they can be made to feel that it is dishonest, they will continue to do it if the stores are not under lock and key.

A small establishment is in this way more expensive, because it is not possible, as it is in a large one, to have a separate table for the different grades.

For example, in an institution with 1000 patients there may be four grades of employees:

- 1<sup>st</sup>. House officers and heads of departments.
- 2<sup>nd</sup>. Nurses and second assistants.
- 3<sup>rd</sup>. Engineers, workmen, etc.
- 4<sup>th</sup>. Scrub-women, janitors, choremens, etc.

Each of these grades can have a separate eating-room with different hours and bill of fare. The average cost will be 30 to 40 cents.

In a small hospital with the cottage system, where

all have the same food, the expense will probably be 10 cents per capita higher.

At one large hospital one week's results showed that it cost 23 cents per patient per day for raw food; 37 cents per officer; 30 cents per nurse; and 35 cents per helper. This gave an average cost of about 31 cents.

The only thing for the governing head of an institution to do is to have its accounts so kept that he can study its own special conditions and decide what, all things considered, it is best to do, and then to give orders to have it strictly carried out. In one case, \$12,000 was saved in a year by this means. A little relaxing of the strictness, however, in deference to the common demand soon allowed the expense to creep back.

In the present transition stage from the old to the new, culinary and housekeeping management is in much the same condition in households large and small. Neither the apparatus nor the helpers are suitable and adapted to the work they should do to bring this department up to the standard of the best modern equipment. Here is a field for invention and organization open to women with business training. Will they take advantage of it?

The same struggle is going on in schools and colleges — a struggle caused by the decided change in tastes and habits of the people without a corresponding change in the means of meeting them. Everywhere improvements are made in building; laboratories are added, libraries are put up, lecture-halls are better lighted and heated, and some feeble attempts are made

to ventilate them. The institution is lauded as being up to date. The last place to feel this wave of progress is the culinary department. Old worn-out ranges, low unventilated kitchens, grease-soaked sinks and tables are retained.

When the therapeutic value of food is more fully recognized, there will be greater willingness to authorize the expense required in providing and preparing the best. If the surest means of securing immunity from attacks of disease is well-nourished tissues, then the best hand-maid of medicine is that nourishment which will be accepted by the tissues, and thus aid in vanquishing the enemy which has already a foothold. The members of the medical profession have yet to appreciate to the full what the scientific cook could do for them. The difficulty lies with the opinions of the general public, as Mrs. Campbell \* says:

"It is always easier, even for otherwise intelligent folk, to swallow something from a bottle or box than to obey natural law. When old Plum's brother Darius died, they flocked in over the hills to the funeral, and one of the cousins asked what Darius had died of, and Aunt Prissy, who had provided him pie three times a day for forty-five years, made the reply, 'Darius died because his digesters was all wore out.'" And again she says:

"I can study degenerates right here — that is what you are all at, I believe; a population that has chosen patent medicine instead of common sense, all the diseases born of old English obstinacy and New England folly."

\* The Linborough Sanitarium.

To adapt the food to the conditions of environment is to go a long way toward conquering fate.

To recognize the essentially animal character of the human body, while not ignoring the temporary power of the mind over matter, is essential to a sound therapy of food.

## CHAPTER IX

### FOOD FOR MIDDLE LIFE AND OLD AGE

"Discerne of the coming on of yeares, and thinke not to doe the same things still, for age will not be defied." — BACON.

If we agree to the definition of food given on page 11, we shall be prepared to accept the statement that when the enthusiasm of youth abates and the active movements decrease; when we allow the children to go up-stairs for a forgotten handkerchief; when we contentedly sit on the piazza and see the young people start off to the mountain or the lake, we are not in a condition to utilize the same amounts of food as when we were younger and more restless.

Appetite usually outstays physiological need, and when the art of the cook adds flavor and daintiness of serving to the food, the danger is tenfold. With abundance of food and money to spend, more middle-aged persons eat too much than too little; eat too concentrated food and drink too little water.

A list kept for some years of persons of fifty to sixty dying suddenly is full of cases like the following: "He seemed to be in ordinary health during the forenoon, and at noon lunched heartily in the State House Café; at 1.30 he complained of not feeling well. . . . At 2.30 he was dead."

The case of a well-known and favorite author was reported thus: "At noon to-day he attended a lunch-

eon to bid farewell to some friends about to leave for the Mediterranean. He was cheerful and gave no indication of illness. After the luncheon he started on a walk. . . . He felt ill, asked leave to lie down at a house, and was found dead in a few minutes."

The reporter never seems to connect cause and effect.

The mere number of years is not so important as the physiological age of the person, if we may so express it. Whenever, from any cause, the individual ceases to eliminate the excess and begins to store up substance, it is time to take precautions lest the strain cause a weakness in some organ or tissue. Overwork bears the blame for the breakdowns so common. Overwork is almost impossible to the well-nourished person. The brain is sensitive to the poison of imperfectly digested food. For modern science makes it clear that it is not only possible but probable that decompositions may easily go on in the body which yield more or less toxic substances to the circulating blood. These substances do not necessarily kill; like extracted alkaloids, they may stimulate the nervous action and stimulate beyond the power of nutrition. Wakefulness, anxiousness, sleeplessness may all be caused by mal-nutrition arising from imperfect assimilation of abundant food-materials. Digestion in its correct sense only renders the food absorbable. If this prepared food cannot be taken by the tissues, it may undergo decomposition and thus become a source of danger. The mature person is not dependent upon food eaten to-day for to-day's strength. It is yesterday's or last week's meal which is held in reserve.

The warnings of nature pass unheeded, because the

individual is deaf and blind to them, having grown up with the firm belief that it makes no difference what, when, or where he eats. Because he still takes pleasure in his food, he dismisses the physician whom he has called in to prescribe for his stiff joints or irregular heart. I well remember with what astonishment I made the discovery that a fancied heart-disease which made climbing stairs distressful disappeared before a more abstemious diet, and was, therefore, not a sign of breaking up at fifty — a corresponding relief!

Personally, I believe a more nearly vegetarian diet is better, partly since it gives less chance of those inventions of some diabolical cook in past ages, handed down because of man's sins, the rich gravies and sauces with which so many meats are served, and partly since the kidneys so frequently show the strain of previous excess and are not able to eliminate so much nitrogen. Again, when food of vegetable origin fails to digest, it does not give rise to toxines, so far as our present knowledge goes. By vegetable food most persons understand white bread, potatoes, rice, etc., all starchy foods. These are not always well endured, and frequently give rise to acid conditions which result in various inflammatory diseases. Fruits, especially those picked green and transported in cold storage, affect some persons in the same way. There are, however, abundant materials without using an excess of these. It is probable that about half of the calories, half the starch, and two-thirds the protein that he could well utilize at twenty-five or thirty, may fully serve a person at sixty.

Investigations by Forster show the following proportions for

	Protein, grams.	Fat, grams.	Carbohy- drate, grams.	Calories.
Old men.....	92	45	332	2149
Old women.....	80	49	266	1875

As the taste becomes blunted and the circulation slows down, smaller quantities may be well supplemented by more frequent eating, as in childhood, though for a different reason.

It would probably answer very well to give the old and the young the same kinds of food; the old, because it furnishes heat which their lack of motion makes it difficult to obtain; the young, because it furnishes heat to use up in mere motion. Both are fond of sugar and of fruit. Eggs are good for both, but rice for the old must be replaced for the child by whole wheat with its ash and phosphates. To the aged may be permitted the use of such stimulants as tea or coffee, which must be forbidden to the young because they not only do not require but are positively injured by such artificial excitants.

Nine out of ten will say that they would rather live a shorter time and enjoy the years they have. But the pity of it is, they do not enjoy life; they become stiff in the joints and irritable in mind, making mistakes in family life and in business, and in their effort to rid themselves of the consequences of folly become mentally weakened and too often morally so blinded that death seems preferable to life. We are apt to think only of the grosser sins as causes of nervous depression and mental breakdowns, and to pass by the

more common sins against the fundamental law of life — nutrition.

As men grow wiser, as they value effective human life more nearly as they value a machine, they will banish at least one-third of the concoctions with which men are tempted to their undoing. Temperance in eating is quite as necessary as in anything else, and with the network of trolley-cars jarring our nerves and taking from us the need of exercise, we are in danger of becoming very ineffective.

A great trouble is that we are not willing to confess to any weakness. We can eat what any one can. We can do anything; we Americans are superior to laws. We are not growing old. We are afraid of thinking about our food. This has a basis of truth. Many persons cannot themselves hold a balance of judgment as to what they shall eat without danger of diverting the nervous force from its proper work.

But the greatest danger lies in the credulity which still lingers in the public mind, the willingness to try any quick and sure remedy. Quack foods are, perhaps, more pernicious than quack medicines. Possibly the one is the corollary of the other. To one who knows anything of the physiological laws of nutrition, it is disheartening to hear a group of friends in middle life, who are gaining in weight and beginning to suffer twinges of rheumatism, discussing this or that antacid medicine; a special mineral water. Each favors a sea voyage to be undertaken at great sacrifice, when the remedy is clearly just a little self-control, a passing by of a course or two, an abstinence from a few favorite dishes.

## CHAPTER X

### DIETARIES OR KNOWN AMOUNTS OF FOOD: GENERAL PRINCIPLES FOR THE GUID- ANCE OF THE PURVEYOR

"What strikes us rather as the special evil of the generation is an increase of the force of whim, of the inclination; that is, to gratify impulse without reference to old restraints and of a certain reaction against goodness because the value placed on it is seen to be gathering strength . . . the almost limitless freedom which money in large amounts can give." — London *Spectator*, July 1901.

THE terms diet and dietaries are used, except in Chapter VIII, in the sense of daily fare regulated with reference to the preservation of health, and not with reference to the restoration of health once lost. In popular thought, the latter meaning is almost always the only one. If one diets, it is because he is ill; has transgressed one or several of the laws of nature and must be punished. Therefore any hint of attention to dietetics implies putting one's inclinations in prison, implies a restriction to which, as free-born Americans, we cannot submit. This use of these terms must be driven out by education in hygiene in the public schools and by the public press. Health, and not convalescence, must be the goal of man's ambition.

By a dietary, then, we mean that amount and combination of food which will keep the given person or group of persons in full health, if, to begin with, they

are normal. If they are (as, alas! too many are) abnormal to begin with, then the other or medicinal sense has to be mingled with our thought. The restriction in the following chapters is put upon the *cost* of a good and sufficient dietary mainly for well persons.

This item is dwelt upon because so large a proportion of the average income is spent for food and so few providers keep tally of the cost as they buy from week to week; that is, of the cost of the  *nutritive portion* of the food. They may know how much money they spend, but not what they obtain for it.

We base our estimates on what is known as a standard dietary; that is, the amount of the different foodstuffs which have sufficed for various races, families, and individuals under known conditions.

These foodstuffs, although found in many combinations under numerous forms, are yet very few in number and are for the most part capable of approximate estimation.

In each land there are half a dozen foods which may be substituted for as many known by different names in other lands. Food synonyms, they might be termed.

But many combinations of two or more are more easily made which may be substituted the one for the other, provided only that change of food is not made suddenly. Acclimatization consists largely in modification of food habits.

In practice we allow about 10 per cent for waste in the body through non-assimilation, and if there is a liberal diet with much choice of dishes, 10 per cent more for kitchen- and table-waste.

For example, if we wish to be sure that our group of

students really have 100 grams of protein or of fat in their daily food, we must provide 125 grams of each.

It should be easy for any one to make out a dietary from Bulletin No. 28, U. S. Office of Experiment Stations, or Farmers' Bulletin No. 142, "Principles of Nutrition and Nutritive Value of Food," for any given cost; that is, for the raw materials. The science of it — how to cook, flavor, and combine them — there is the field for fancy, for art, for invention. At present cooking is an art, crude and variable, and scientific accuracy cannot be demanded of it. Hence the wide margin which must be allowed for spoiled and rejected food.

For this reason, also, no definite menu can be given such as is constantly asked for. Because it is refused, the whole subject is usually relegated to the mental dump-heap. "What is one man's meat is another man's poison" is yet true, and also that one cook can make into delicious, nutritious dishes what another would make unfit for civilized man.

Only the raw food-materials can be treated with any degree of accuracy. This degree is surer, within a limited range, than was formerly supposed. Analyses of various food-materials have now been made so abundantly that an average can be drawn sufficient for the month or year. One day's ration might not be so closely calculated, and it is not needful that it should be. These analyses are now at the service of any one who will take the trouble to study them. Until we have on all sides a certain familiarity with these exact figures, there will be bandied about from household magazine to newspaper assertions of facts on the one side and denials

on the other which destroy the confidence of the public in either. For instance, in Boston's most respectable daily (*The Advertiser*) of August 9, 1901, there appeared a heading: "Feeding Four on 25 Cents a Day." The article began:

"The usual run of papers in cooking-magazines are good, and many of them are excellent, giving much-needed information, useful advice, and timely facts, but the average paper on economy in feeding a household is misleading and sometimes sadly inaccurate.

"For instance, in a leading household magazine appeared an article of this sort, in which, among other things, it was stated that one woman said it was possible to feed a family of four or five, healthfully and appetizingly on 25 cents a day, while another said she could not set an ordinary table under 50 cents a day. Now the question is, could the woman who thought she could feed four or five on 25 cents a day, and give them sufficient food, do so?"

I do not know what the original article did say, but it is probable that the 25 cents per day was for one person, not for the four. We are accustomed to speak of the 25-cent, or the \$1-a-day dietary, meaning the expense per day for one person. Here the need for exact and complete statement is evident. The newspaper writer was quite correct in assuming that for six cents per day per person grain mushes must make the bulk of the food, for even the prison inmate, receiving the simplest sort of a diet, is not fed on less than 11 to 12 cents a day.

The article goes on:

"And most of these statements won't hold. Without

wishing too sharply to criticise the statements of Miss —, the teacher of the — Cooking-school, it is impossible to accept some of her statements. She said: ‘Three of the students of our class were chosen to give a breakfast at graduation. We were allowed \$3 to buy the materials, and we had 24 guests. We had the best of everything, and it cost us just \$2.80. Here is the menu we served:

Strawberries with Cream

Hominy with Cream

Broiled Shad

French-fried Potatoes

Sliced Cucumbers

Rolls

Coffee.

“I remember strawberries cost 25 cents a quart, and we required three quarts. We served two large shad, and \$2.80 covered the breakfast, including the smallest details.”

“Here it is not the cost of the meal that awakens surprise, but one of the items. Miss — says that 24 guests, and presumably the three students who got up the breakfast, 27 in all, were served with three quarts of strawberries. Will any one who remembers what a quart of strawberries shrinks to by the time the berries are hulled try to divide it into nine portions, and say if the result constitutes what any one could conscientiously term a helping of strawberries?”

Here the snapshot of the daily-news purveyor needs correcting. A “quart” of strawberries such as the writer had in mind which “shrinks,” etc., purchased when the fruit is dear, does not yield much, if any, over a pint, but the “quart” of selected native berries such as would be used by these young cooks at this time of

year would measure very nearly the estimated quantity. Six portions are allowed for a quart by the caterers, and in a case like this, where economy was enjoined, eight portions to a quart was not so very niggardly after all. Just for the amusement of it, the author determined the quantities, mainly according to Miss Huntington's estimates and the food values of the menu as given. The results, shown in the accompanying table, are most instructive and completely vindicate this class-work.

TABLE VII. BREAKFAST FOR 24 PERSONS (1901)

	Lb.	Oz.	Cost.	Prot.	Fat.	Carb.	Cal.
Strawberries, 3 quarts.....	5	....	\$0.75	20	14	138	775
Hominy.....	1	2	0.03	46	27	438	2,246
Thin cream, 3 cups.....	1	12	0.187	18	134	32.5	1,460
Shad.....	6	....	0.72	390	130	....	2,810
French-fried potatoes.....	4	....	0.04	3.2	1.6	272	1,160
Fat.....	....	4	0.01	....	113	....	1,042
Rolls, 3 doz. home-made.....	4½	....	0.15	285	45	1620	8,160
Butter for fish and rolls.....	....	12	0.20	2.8	285	....	2,660
Cucumbers.....	3	....	0.15	....	....	28.6	120
Coffee.....	....	....	0.12	....	....	....	....
Sugar, 2 lbs. 4 oz.....	....	36	0.113	....	....	432	1,768
Cream, 1½ cups.....	....	12.8	0.093	9	67	16.7	730
			\$2.563	774	817	2978	22,931
For one person.....	....	....	0.103	32.2	34.0	124	955
The standard ration.....	....	....	....	33.3	33.3	140	1,010

So that the three little cooks could have made a fair breakfast without seriously robbing the guests. One of the other meals could easily remedy any slight deficiency.

This particular case is of no special importance. It is given in detail simply because it illustrates so admirably the following points, which the author wishes to emphasize.

*1st.* Popular disbelief in and distrust of the efforts made to teach more exact methods in catering.

*2nd.* Failure on the part of the teachers to bring their methods within the comprehension of the average reader.

*3rd.* General ignorance of the nutritive value of food materials as purchased.

*4th.* Common neglect of the element of waste in preparation and in assimilation.

*5th.* The results tabulated furnish an illustration of one way in which the teaching may be made more practical.

The following luncheons are suggestive of what may be served at a low price, but still giving sufficient nourishment and variety.

LUNCHEONS COSTING 10 CENTS A PERSON PREPARED  
AND SERVED BY SEVENTH GRADE CHILDREN TO  
25 TEACHERS,\* 1916.

	Clear Tomato Soup	
	Oakhill Potatoes	
Rolls		Jelly
	Norwegian Prune Pudding	
	Tea	
	Lamb Stew	
Cabbage Salad		Golden Corn Cake
	Cocoanut Tapioca	
	Tea	

\* For these luncheons as well as those on page 42 I am indebted to Miss Jenny H. Snow of the Chicago Normal College.

	Goldenrod Egg	
Saratoga Chips		Corn
Biscuit	Norwegian Prune Pudding Tea	
	Cream Beef on Toast	
Stewed Tomatoes		Muffins
	Rice Pudding Tea	
	Baked Potatoes in Half Shell Sardines	
Corn		Biscuit
	Fruit Salad Tea	
	Baked Macaroni	
Corn		Biscuit
	Scalloped Apples Tea	
	Lamb Stew	
Baking Powder Biscuit		Jelly
Ginger Bread		Custard
	Tea	

Dr. Lusk, estimating the minimum requirements of an average family of five (father, mother, and three children), at 11,400 calories, shows that more than half of these calories might be obtained from bread, butter,

milk, and sugar at a cost of 40 cents; the other 5400 calories must be supplied from other foods.

	Calories.	Cost in cents.
Total food.....	11,400	.....
Bread.....	1,500	5
Butter.....	1,500	15
Milk.....	1,500	16
Sugar.....	1,500	4
	6,000	40

"Eight cents a day may buy this half of the day's energy requirement for a member of a family, be the family rich or poor. It is the way the remainder is obtained that increases the cost of living."

## CHAPTER XI

### DIETARIES COSTING FROM 15 TO 20 CENTS PER PERSON PER DAY

"The Golden Rule is let all men's dinners be according to their means." — HAYWARD.

(Reviser's note: Any complete revision of the material in the following four chapters is impossible. It should be remembered that prices have increased at least 33 per cent since Mrs. Richards collected the data and that present prices, 1917, would be that much higher, barring the temporary inflation at the time of revision. Some very old material has been eliminated, a little new has been added, but the chapters remain substantially the same.)

THE business-man who frequently pays one dollar for his luncheon and two dollars for his dinner, and who knows that his own table costs him one hundred dollars a month for a family of three, receives with incredulity the statement that *within a few years* 10 cents per person per day might have given sufficient nutrition for a wholesome diet, particularly where purchases can be made at wholesale. For instance, in one college boarding hall in the south  $13\frac{1}{2}$  cents per person per day for spring and fall and 15 cents in the winter have furnished (1916) an adequate and palatable diet.

The woman who has tried to cut down her expenses by saving in the food-material purchased sighs and

shakes her head. Her dictum is final: "It cannot be done."

And yet we know that it has been done; that efficient life has been maintained at least for a time in the case of many persons for this sum. It is the will to do it and the motive which sustains the will, that are necessary.

Appetite is largely a matter of habit and of mental orientation. The man who has his eyes fixed on a good for which he is willing to subordinate everything else can maintain health without the luxuries of the table. He finds that food which will serve him best, and is not tempted by that which is useless. Alas! how few have the knowledge, the strength of purpose, and the healthy body to enable them to do this. There is abundant testimony to the clearness of brain and strength of muscle gained by living "close to nature" on the perfected products of the soil. There is also abundant testimony as to failure in attempting to do this by persons without the will, the knowledge, or the physical stamina to succeed.

There will, therefore, always be two parties: the one small and select, the other large and vociferous; the latter claiming that life at less than 50 cents per day for food is not worth living.

It is just as impossible and just as unwise for a person drunk with beef and highly seasoned food to stop short and try to live on shredded wheat and milk, as for the toper to change his habits to total abstinence. Every cell in the body in either case calls out for its accustomed stimulant, and the struggle is more than sufficient to use up all the energy which the body can develop.

As a mere matter of scientific fact we must assert

that, given a normal digestion with the *will* to do the best thing for one's self, it is possible so to select and prepare food that it need not cost over 15 to 20 cents per person per day.

To substantiate this, we offer the following facts.

First, the staple diet of the world is made up of one or more cereals. These furnish an average of 1600 calories per pound. Two pounds is ample for the needs of the workingman at a cost of three to six cents per pound. In order to fill present day dietetic requirements part of the cereal, however, must be replaced by milk, vegetables, fruit, sugar, fat of some kind, and some meat or meat substitute, costing in all 12 to 14 cents.

With 10 kinds of cereals, 10 other foods, and 40 flavors, hundreds of combinations are possible if only any inventive skill were exercised in the preparation and serving. In this direction the women of America are singularly lacking. The same limited round of roast, baked, and boiled, is served with the same excess of crude flavor week after week, so that it is no wonder that variety is constantly called for — variety of badness it is, too, as a rule.

If we could only apply the same sagacity and business acumen to the food-supply of the young engineer as we do to his mechanical training!

But, alas! we have mind as well as matter to deal with and, worse than all tradition, the fetish of the past. One person likes caraway-seeds, another will not eat cookies so flavored, and these small likes and dislikes are permitted to overbalance health.

We take no warning from other animals and from plants, all of which fail of their best end when overfed.

Nature does not make an exception in favor of man. The individual may thrive like a forced plant, but not so the race. In all the discussion of the infertility of the higher branches of the human race, how little attention is paid to the weakening effect of pampered appetite!

We are always asked to give a menu for the use of these simple foods. How is it possible when the flavor depends on a score of variables — time and degree of heat in the cooking, amount of water, salt, and condiment added, combinations made, when acceptability depends quite as much on the way the prepared food is served, the company in which it is eaten, the temper of the individual at the time of eating, as on the food itself?

The object of this book is not so much to give information as to stimulate research. A more effectual preparation of the food-supply must be secured by original research.

It is possible that one of the best evidences of a development of better "taste" and better ideals in art will be found in better furniture and pictures and less money spent in crude food. How can we be otherwise than materialistic so long as our food is so gross and handled in so repulsive a manner? Was there ever so barbarous a sight as the modern kitchen, with its red-hot range, its perspiring cooks, its slovenly maids, its ill-smelling cold storage?

May I ask each reader to call up in his eye the picture which to him is most typical of that for which the word food stands? For the city dweller it may be a medley of half-clothed, dripping persons, greasy dishes and pails of refuse, to the presence of which attention is loudly

called as one passes the basement windows of hotel or restaurant. The most vivid impression left after a half hour's passage along the streets of any down-town section will be that of burned fat, hot, steam-carried vapors of indescribable sorts. Even worse are the meat-shops, the windows displaying in all their repulsive nakedness the creatures which man kills for his own use — fish, flesh, and fowl; even barrels of potatoes, beets, and cabbages, with remains of their recent contact with the soil, are not much improvement. What wonder that we try to forget the crude materials in French names, grotesque shapes, or excessive garnishing! What wonder that to be hungry is a rare sensation, that a loathing for food is overcome only by wines and spices in good company! What wonder that any dark place is held to be good enough to perform the rites of transformation for such horrors!

Even the fresh, juicy fruits with their tempting display of color are paraded in line with the clouds of street-dust, and stirred constantly by the ubiquitous feather duster.

In the country the gross treatment of food follows city ways, and the universal pig evidences the waste and the failure to provide satisfactory viands.

All indications point to the low estimation in which food and its preparation is now held, in contrast to the time when kings and statesmen were proud to have dishes named for them. Is it, then, a subject to be shunned? Is it, then, no matter for concern what manner of food is offered to the coming race? Has it no effect on the soul that its outer envelope is so vilely treated? A right point of view is essential to our dis-

cussion, and certain dogmatic statements may serve to orient us at the start in order that we may proceed on harmonious lines.

Suppose we state it in the form of a creed.

1. I believe that "man is what he eats"; i.e., that the kind of food going to make up the physical body reacts upon the nervous system, affecting mind and character.

2. I believe that man is "the noblest work of God" only when he uses his body as a means of expression of high ideals, and not as a means of gratifying momentary desires.

3. I believe that "he that ruleth his own spirit is greater than he that taketh a city"; to control one's appetite in view of the aims in life which one holds up to the inner vision; to so order one's life that one has a fair chance of attaining one's ideals is man's prerogative, and differentiates him from the beast of the field.

4. I believe that man's efficiency in this world, if not his happiness in the next, is mainly due to the precautions he takes to use suitable food and to avoid dangerous combinations.

5. I believe that "the duty that lies next" is the instruction of all the people in food values and the inculcation of a respect for the body and the office of food as a means to an end, and that end — the highest duty of man.

6. I believe that temperance in the use of food is even more essential than in anything else which tempts man's appetite.

7. I believe that good food habits can be formed in

childhood which will carry the man through life in as great a degree of safety as other good habits early formed may do.

Self-control, self-limiting factors are not sufficiently taught. In the rage for freedom, for self-expression, many are apt to include Nature's laws among the trammels to be thrown off. Such consider the unrestricted choice of food as freedom. The consequences of this freedom are wilfully laid to some other door.

If this kind of rashness *killed*, it would not so much matter; but with philanthropic, sentimental helps at hand, life is prolonged to the misery of others, if not to the individual suffering. Appetite for liquor is guarded against; appetite for sweets, spices, and rich food is passed by in the nursery and in school as of no moment. The child must eat something, and so his crying brings the coveted tidbit of which he should never have known the taste. A cultivated taste in food is as much or more needed than a cultivated taste in art. Just as in furnishing a house it is not the money spent, but the good taste in the arrangement of the whole, as well as in the choice of the individual articles, so in food for the table it is not the amount of money spent, but the sort of material purchased and the way it is treated after it is purchased which determines the effectiveness of the expenditure.

How shall we characterize that man who with a name to win, a prize to strive for,—it may be a fortune or a reputation, it may be laboratory research or exploration,—deliberately cripples himself, imperils his usefulness if not his life, brings sadness and care into the lives of those he loves most, yet allows himself to be

allured by the pleasures of the palate, or even merely ignores the laws of health?

It is the boast of civilization that man has conquered the forces of nature, harnessed the lightning, etc., but he has done it by learning the laws under which these forces work and adapting his machine to those laws, not by running counter to them. And yet we see an engineer who understands this full well violating every law which Nature has laid down for the guidance of man to efficient manhood. Because he is not called upon to pay the penalty immediately, he professes to think there is none.

So long do folk-lore and tradition persist after science has illuminated the page..

TABLE VIII. TWENTY IMPORTANT FOODS CONSIDERED AS TO THEIR NUTRITIVE AND ECONOMIC VALUES

	Ref-use, per cent.	Water, per cent.	Pro-tein, per cent.	Fat, per cent.	Car-bohy-drate, per cent.	Ash.	Calo-ries per lb.
Butter.....	.....	12.73	1	85	.....	.....	3491
Chocolate.....	.....	5.9	12.9	48.7	30.3	2.2	2772
Cheese (Am.).....	.....	35	28.8	35.9	0.3	.....	1990
Nuts (peanuts).....	24.5	6.9	19.5	29.1	18.5	1.5	1858
Sugar.....	.....	.....	.....	.....	100	.....	1815
Oatmeal.....	.....	.....	16.1	7.2	67.5	.....	1811
Macaroni.....	.....	10.3	13.4	0.9	74.1	1.3	1625
Corn meal.....	.....	12.5	9.2	1.9	75.4	1	1620
Wheat flour (roller process).....	.....	11.5	11.4	1	75.6	0.5	1620
Legumes (dried peas).....	.....	9.5	24.6	1	62	2.9	1612
Rice.....	.....	12.3	8	0.3	79	0.4	1591
Rye flour.....	.....	12.9	6.8	0.9	78.7	0.7	1588
Meats (beef loin).....	13.3	52.9	16.4	16.9	.....	0.9	988
Eggs.....	11.2	65.5	11.9	9.3	.....	0.9	594
Fish (cod steak).....	9.2	72.4	17	0.5	.....	0.1	329
Milk.....	.....	87	3.3	4	5	.....	325
Potatoes.....	20	62.6	1.8	0.1	14.7	0.8	302
Bananas.....	35	48.9	0.8	0.4	14.3	0.6	290
Apples.....	25	63.3	0.3	0.3	10.8	0.3	214
Cabbage.....	15	77.7	1.4	0.2	4.8	0.9	121

A man of sedentary occupation requires 2500 calories daily.

WEIGHTS OF VARIOUS FOODS NECESSARY TO FURNISH 2500  
CALORIES AND COST AT SECOND AVENUE AND 19TH STREET,  
NEW YORK CITY, 1916\*

Lb. Oz.		Cents per lb.		
I 9	Corn meal.....	3	Furnishes 2500 calories for	\$0.042
I 6½	Oatmeal.....	4	"	0.052
I 9	Wheat flour (roller process)	4	"	0.064
I 9	Rice (broken).....	5	"	0.072
I 9	Rye flour.....	5	"	0.072
I 6½	Sugar.....	8	"	0.114
I 4	Peanuts.....	10	"	0.122
I 9	Macaroni.....	10	"	0.152
I 9	Legumes (dried peas).....	10	"	0.152
I 9	Rice.....	10	"	0.152
8 4½	Potatoes.....	2	"	0.162
I 4	Cheese (Am.).....	20	"	0.25
12½	Butter.....	32	"	0.25
7 15½	Milk (7¢ qt.).....	3½	"	0.272
15	Milk (skim, 4¢ qt.).....	2	"	0.30
12½	Butter.....	40	"	0.312
7 15½	Milk (10¢ qt.).....	5	"	0.394
14½	Chocolate.....	50	"	0.45
8 9½	Bananas.....	6	"	0.512
II 11½	Apples.....	5	"	0.584
20 10	Cabbage.....	3	"	0.62
2 8	Meat (beef loin).....	30	"	0.75
4 2½	Eggs (36¢ doz.).....	24	"	1.01
7 9½	Fish (cod steak).....	20	"	1.51

\* "Food Economics," by Graham Lusk.

To work up a dietary in any given case, begin with the least expensive foods and substitute foods of equal physiologic value (so far as is known) up to the limit of money in hand. For instance: The following general statement\* is given for the day's food for a man who does fairly hard muscular work:

"I  $\frac{1}{4}$  lbs. of bread, having about the same food value as 1 pound of such cereal preparations as wheat or rye flour, oatmeal, corn meal, rice.

"2 ounces, or  $\frac{1}{4}$  cup of butter, oil, meat drippings, or other fat.

\* From Farmer's Bulletin 808, "How to Select Foods." March, 1917.

TABLE IX. DIETARY FOR A FAMILY OF SIX

	Grams.			Calo- ries.	Cost, 1900.	Cost, 1916.
	Pro- tein.	Fat.	Carbo- hydrate			
<i>Breakfast</i>						
Baking powder biscuit..	72.2	39.	447	2,491	\$0.10	\$0.15
Ham (lean).....	81.5	85	....	1,123	0.15	0.30
Butter.....	0.2	36	....	333	0.025	0.038
Potatoes.....	16	0.8	138	650	0.02	0.06
Milk for coffee.....	6	7	8	122	0.01	0.015
Sugar for coffee.....	....	....	60	246	0.007	0.011
	175.9	167.8	653	4,965	0.312	0.574
<i>Dinner</i>						
Beef-shank stew.....	185	53	....	1,251	0.24	0.30
Potatoes.....	8	0.4	69	325	0.01	0.03
Turnips.....	4.5	0.5	28	138	0.02	0.034
Thickening.....	7.5	24.7	53	477	0.015	0.005
Suet pudding:						
Beef suet.....	....	220	....	2,040	0.03	0.06
Flour.....	66	6	428	2,056	0.028	0.08
Molasses.....	....	....	113	463	0.02	0.04
Sweet sauce.....	....	10	50	298	0.01	0.02
	271	314.6	741	7,048	0.373	0.569
<i>Supper</i>						
Milk.....	15	18	22.7	325	0.03	0.04
Bread and butter.....	61	126.5	319	2,734	0.10	0.12
Stewed pears.....	4	5	216	962	0.045	0.07
	80	149.5	557.7	4,021	0.175	0.23
<i>Totals</i>						
Breakfast.....	176	168	653	4,965	0.312	0.574
Dinner.....	271	315	741	7,048	0.373	0.569
Supper.....	80	150	558	4,021	0.175	0.23
	527	633	1952	16,034	0.86	1.373
Tea and coffee.....	....	....	....	....	0.04	0.04
	88	105.5	325.3	2,672	0.90	1.413
Per person....	....				0.15	0.235

*Note.* — This table is substantially that in the earlier editions, with the cost given for 1916 as closely as is possible from the rather meagre data in the table. Reviser.

"2 ounces, or  $\frac{1}{4}$  cup of sugar; or  $\frac{1}{3}$  cup of honey, or sirup; or an equivalent amount of other sweet.

" $1\frac{1}{4}$  pounds of food from the following: Fresh fruits (or 3 or 4 ounces of dried fruits), and green or root vegetables.

"12 ounces of food from a class which may be called 'meats and meat substitutes'; that is, moderately fat meats, poultry, fish, eggs, cheese, dried legumes (beans, peas, lentils, cowpeas, and peanuts). Milk also belongs among these foods, but, because of the large amount of water it contains, half a glass, or 4 ounces, of it would be required to equal an ounce of any one of the others."

From this list, dietaries of varying cost may easily be made.

The nearer a vegetarian diet is approached, the easier will it be to furnish an inexpensive table, but the greater wisdom will be required in choosing both the food itself and the manner of preparation. For most of the poorer class, it is easier and wiser for the mother to go out two or three days in the week to earn money with which to supply meat, even if the children are left to themselves. This may seem rank heresy, but to choose wisely means more knowledge than the foreign mother possesses, confronted as she is by dozens of foods of which neither she nor her grandmother have had that experience which counts for knowledge.

The following menu, Table X, is suggestive of what may be done with reasonable care for 20 to 25 cents per person per day.

It is customary today to estimate the cost of food for a day per unit, rather than per person. The needs of a man at moderately hard labor are taken as the unit.

**TABLE X. MENU, WITHOUT MEAT  
FOR A FAMILY OF MODERATE MEANS**

- Breakfast: Stewed apricots, boiled hominy and milk, toast and butter, coffee.
- Luncheon: Rice croquettes, brown sugar sirup, bread and butter, sliced oranges.
- Dinner: Cheese omelet, baked potatoes, shredded lettuce and celery salad, brown Betty and hard sauce, bread and butter.

The following table is used in calculating the food needed by other members of the family.

**TABLE OF UNITS**

Man (17 yrs. and over).....	1.0
Woman (16 yrs. and over).....	0.8
Boy 16 yrs.....	0.9
Boy 12-15 yrs.....	0.8
Boy 10-11 yrs.....	0.6
Girl 14-15 yrs.....	0.7
Girl 10-13 yrs.....	0.6
Child 6-9 yrs.....	0.5
Child 2-5 yrs.....	0.4
Child under 2 yrs.....	0.3

The following estimate of dietary needs was prepared by Winifred S. Gibbs, formerly of the Society for Improving the Condition of the Poor, New York City.

**DIETARY NEEDS**

[Family — Woman (widow), man (son over 17), girl 11, boy 9, boy 4, boy 1, — units 3.6, \$0.27 per unit per day.]

**MONTHLY ESTIMATE OF LIVING NEEDS.**

Rent.....	\$10.50
Food.....	29.48
Fuel and light.....	3.25
Clothing.....	12.00
Sundries.....	5.00
	<hr/>
	\$60.23

## DIETARY FOR ONE WEEK.

TABLE XI

Food.	Amount.	Winter, 1915-16.	Summer, 1916.	Fall, 1916.	Calories.
Bread.....	14½ lb.	\$0.87	\$0.87	\$1.01	17,139
Butter.....	2 "	0.72	0.74	0.74	6,982
Milk.....	21 qts.	1.47	1.47	1.89	13,650
Eggs.....	1½ doz.	0.60	0.63	0.68	1,188
Cereal.....	6 lb.	0.18	0.24	0.36	9,720
Tea, coffee, cocoa.....	1½ "	0.38	0.38	0.38	282.25
Sugar.....	4¾ "	0.29	0.33	0.38	8,601.25
Meat.....	4 "	0.88	0.88	0.96	3,952
Potatoes.....	16 "	0.40	0.48	0.64	4,832
Vegetables.....	15 "	0.45	0.45	0.60	1,815
Fruit.....	11 "	0.44	0.44	0.44	2,750
Per person per day...		\$6.68	\$6.91	\$8.08	70,911.5
		0.16	0.17	0.19	

It is to be remembered that in nearly every case those aided by this society have been underfed, and that a somewhat more generous diet is necessary than might be needed in case of a previously well-nourished family.

**SCHEDULE FOR ESTIMATING MINIMUM FAMILY  
BUDGETS**

The United Charities in Chicago, December, 1916, adopted the following food budget for families to whom it is giving aid.

TABLE XII. FOOD

Individuals.	Occupation.	Per day. Food value, calories.	Per week. Cost.
Man (average build) . . . . .	Laborer . . . . .	3600	\$1.95 to \$2.40
Woman (average build) . . . . .	Housewife . . . . .	2600	1.45 " 1.75
Boy 15. . . . .	Outdoor or factory . . . . .	2800	1.50 " 2.00
Girl 15. . . . .	Factory or shop . . . . .	2400	1.30 " 1.70
Boy 13. . . . .	.....	2400	1.30 " 1.60
Girl 13. . . . .	.....	2300	1.25 " 1.55
Boy 11. . . . .	.....	2100	1.15 " 1.43
Girl 11. . . . .	.....	2100	1.15 " 1.43
Boy 9. . . . .	.....	1900	1.25 " 1.35
Girl 9. . . . .	.....	1800	1.15 " 1.25
Boy 7. . . . .	.....	1650	1.10 " 1.18
Girl 7. . . . .	.....	1600	1.05 " 1.12
Boy 5. . . . .	.....	1500	1.30 " 1.35
Girl 5. . . . .	.....	1450	1.25 " 1.30
Child 3. . . . .	.....	1300	1.18 " 1.20
Child 2. . . . .	.....	1200	1.12 " 1.16
Child 1. . . . .	.....	1000	1.00 " 1.05

*Note.* — Increase 10 per cent for maternity or outdoor work.

## CHAPTER XII

### TWENTY-FIVE TO THIRTY CENTS PER PERSON PER DAY

A learned French judge, Henrion de Penesey, said to three of the most distinguished men of science, the mathematician Laplace, the chemists Chaptol and Berthollet: "I regard the discovery of a dish a far more interesting event than the discovery of a star, for we have already stars enough, but we can never have too many dishes; and I shall not regard the sciences as sufficiently honored or adequately represented amongst us until I see a cook in the first class of the (French) Institute."

TWENTY-FIVE to 30 cents per day per person may be considered the cost of the wage-earner's dietary, since for an income of \$800 to \$1000 a year this means for the family of three or four adults and four children — equivalent to five men as dietaries are reckoned — about \$450, or 45 to 56 per cent of the total income. Statistics show this to be an average the world over. Nearly every family has one or more unproductive members, and too often some one needing care, so that the income must go as far as it can. The American wage-earner is not so far wrong in demanding a liberal diet, but he lacks a knowledge of cost of nutritive units which would enable him to live well on his means. He also allows his children to acquire habits of indulgence which are not only bad for him but for them.

There are two common ways of making a dietary: one, that of taking account of stock in the larder before and after, and of all purchases made — the difference and sum being the food used; the other, in addition,

requires estimation beforehand of what, for the given experiment, should be used and the checking up afterward of the excess or deficit. The latter was the method employed in the following problem given to the class in dietaries at the School of Housekeeping,\* Boston: After a study of the needs of the body in infancy, in school-life, and in active work, and after attempts were made to formulate a 10-cent dietary on scientific principles in order to secure a working basis, the class was required to "Make out a week's bill of fare which *you yourselves will be willing to eat*, to cost not over 25 cents per person daily for raw food-material, and which shall furnish, in the week, the right proportion of the various food-substances."

This is not given as a model bill of fare. Indeed, it is not possible in the present state of vicious habits of eating to give a model menu for as many as sixteen persons, especially women, and more especially women students and teachers, which would be acceptable to them.

The provider, after six months of experience, had learned what dishes would be tolerated and what would be refused, and governed herself accordingly. Only two of the victims found any of the meals wholly unsatisfactory, and all declared that they "bought no more candy than usual," which was very gratifying in view of the much greater cost of their usual fare.

Theoretical dietaries are often at fault in endeavoring to furnish at one meal an exact ratio of the various food-elements and an exact fraction of the total values. Circumstances govern this to a large extent. For

\* Now a part of Simmons College.

instance, one morning after a hearty breakfast, the class under experiment went from one recitation to another, or with only a laboratory exercise all the morning. This day a light luncheon of easily digestible food was clearly called for if any work was to be undertaken in the afternoon. Another day the morning had been spent in a field-excursion to a spice-mill in a neighboring city in cold, windy weather. The luncheon on that day must clearly furnish nearly the usual dinner ration. Writing up notes of a visit will not demand as much brain-energy as will a study-hour on a new subject.

Again, a warm, muggy day indicates a lighter dinner than a clear, crisp one, while a cold morning calls for more butter, cocoa, or some food rich in fat.

The menu should vary with the season. Even for an institution it should be considerably changed four times in the year.

Doubtless the absence of some common dishes is due to the preparation of a "black list" in class a few days before. The same quantity and quality of food will cost, in a small family, 28 to 30 cents.

#### MENUS FOR ONE WEEK FOR \$0.25 A DAY PER PERSON

[Family of sixteen — all women students; 2d and 3d week in April; Eastern city; season very backward. Time, about 1900.]

Breakfast: Cream of wheat, baked beans, brown bread, coffee, cocoa, or milk.

Luncheon: Brown and white bread sandwiches, sliced oranges, cake, cocoa.

Dinner: Soup, saltines, roast fowl (stuffed), hominy, cranberries, lettuce salad with French dressing, ice-cream, cake.

- Breakfast: One-half shredded-wheat biscuit, boiled egg, graham muffins, apple sauce, coffee, cocoa, or milk.
- Luncheon: Hashed chicken on toast, fried hominy, cookies, apricots, tea.
- Dinner: Soup with rice, rib-roll roast, Irish potatoes (mashed), tomatoes, lemon jelly with bananas and nuts.
- Breakfast: One-half orange, wheat germ, creamed cod-fish, corn meal muffins, coffee, cocoa, or milk.
- Luncheon: Vegetable soup, omelet, brown betty, cream.
- Dinner: Split-pea soup, veal roast, Irish potatoes, creamed onions, lettuce salad, saltines, cottage pudding, chocolate sauce.
- Breakfast: Germea, cream toast, bacon, baked apples, coffee, cocoa, or milk.
- Luncheon: Irish stew with dumplings, fruit salad, cookies, cocoa.
- Dinner: Chicken soup, roast leg of mutton, potatoes, beets, Norwegian dessert.
- Breakfast: One-half orange, vitos, hash, dry toast, coffee, cocoa, or milk.
- Luncheon: Creamed potatoes, sausage, raised rolls, nut cake, prunelles, tea.
- Dinner: Soup, chicken-and-beef pie, peas, orange salad, saltines, cracker pudding, cream.
- Breakfast: One-half orange, oatmeal, creamed dried beef, corn cake, coffee, cocoa, or milk.
- Luncheon: Fish chowder, rice-and-mutton croquettes with tomato sauce, salted peanuts, dates.

- Dinner: Tomato soup, baked haddock, hollandaise sauce, mashed potatoes, lima beans, lettuce salad, saltines, suet pudding, lemon sauce.
- Breakfast: One-half orange, pettijohn, fish hash, date muffins, coffee, cocoa, or milk.
- Luncheon: English monkey on toast, vegetable salad, baking-powder biscuit, chocolate.
- Dinner: Bean soup, hamburg steak, baked potatoes, carrots and peas, lettuce salad, saltines, chocolate pudding with hard sauce.

From "Food as a Factor in Student-life" are taken examples of six months' accurate records (Table XIII), and of the daily accounts which enabled them to be so successfully carried out (Tables XIV and XV):

Several significant and interesting facts are shown by an examination of Table XVI, a comparison of a wholesome and sufficient dietary of a school in Indiana, where 600 students were boarded at \$1.40 per week,\* with that of the University of Chicago, where 106 students were boarded at \$3.50 per week. One source of advantage on the side of the school is that a much larger number of persons are fed and certain expenses are proportionately reduced. In the second place, very little service beside student help is furnished at the school, and a large item of expense is thus removed. Another difference is seen in the substitution at the

\* The price of board at this same school during 1915 and 1916 ranged from \$1.90, the cheapest, to \$2.15, the most expensive. In the winter of 1917 it was to be advanced to \$2.50. Compare these figures with \$1.40.

school of cheaper foods, such as cereals, vegetables, sirup, and butterine, for meat, milk, cream, fruits, and other more expensive foods, though the actual amount of nourishment furnished was practically the same in both cases.

TABLE XIII. SUMMARY OF FOOD, MATERIALS, COST, AND COMPOSITION, AT KELLY HALL, UNIVERSITY OF CHICAGO, OCT. 1, 1893, TO APRIL 1, 1894

	Total, pounds.	Cost.	Per cent, waste.	Pro- tein, net.	Fat, net.	Carb., net.
Beef.....	10,260	\$772.19	30	1165	1033	.....
Other fresh meats.....	9,110	734.79	20	1027	774	.....
Ham, etc.....	2,277	249.21	7	367	453.6	.....
Milk, butter, eggs, sugar, etc..	39,179	2015.53	.....	1305.8	3795.3	4,997.9
Grains.....	14,779	615.62	.....	1363.3	198.2	9.374
Potatoes and vegetables.....	21,399	365.06	22	281.1	51.2	2,764
Fresh fruit.....	12,082	315.03	12.5	107	5.7	1,536
Dried fruit.....	2,143	187.19	.....	35.1	1.3	1,139.1
Cakes, etc.....	390	100.38	.....	37.8	54.2	141.3
	119,232	\$5355.00	.....	5689.1	5365.5	19,952.3
Coffee, tea.....	.....	147.17	.....	.....	.....	.....
Sundries and unclassified gro- ceries.....	.....	498.25	.....	.....	.....	.....
		\$6000.42				

These figures divided by the number of days gives *per person per day*

	Pounds.	Cost.	Pro- tein, grams.	Fat, grams.	Carb., grams.	Calo- ries.
Food purchased.....	5	\$25	126	131	402	3383
Nutrients remaining after allow- ance for actual wastes.....	.....	.....	108	102	381	2953

TABLE XIV. ONE DAY'S FOOD, MARCH 17, AT KELLY HALL, UNIVERSITY OF CHICAGO, CALCULATED TO SHOW THE AMOUNTS AND PROPORTIONS OF THE VARIOUS CONSTITUENTS AND THEIR COMPARISON WITH THE AVERAGE FOR SIX MONTHS

Lbs.		Per cent protein.	Per cent fat.	Per cent Carbohydrate.	Lbs. Protein, net.	Lbs. fat, net.	Lbs. carbohydrate, net.	Calories.
50	Stew and cold meat.....	21	8	....	10.5	4	....	....
90	White potatoes.....	1.8	0.2	19.1	1.6	0.18	17.2	....
45	Sweet potatoes.....	1.5	0.4	26	0.7	0.2	11.7	....
4	Dried beef.....	34	7.5	....	1.4	0.3	....	....
77	Flour and grain.....	11.5	1.8	70	8.9	1.4	53.9	....
3	Tapioca.....	1.3	....	83	....	....	2.5	....
192	Milk.....	3.5	3.7	4.7	6.8	7.1	9.0	....
13	Cream.....	3	12	3	0.4	1.6	0.4	....
15	Butter.....	2	83	0.5	0.3	12.5	....	....
15	Sugar.....	....	....	96.5	....	....	14.5	....
6	Prunes.....	3.5	....	65	0.2	....	4.0	....
9	Oranges, less 20% waste.....	1	....	11	....	....	0.8	....
50	Bananas, less 50% waste.....	4.85	....	19.7	1.3	....	5.0	....
7.2	Eggs.....	12.5	12	....	0.9	0.8	....	....
41	Lamb.....	20	15	....	8.2	6.2	....	....
26	Turkey.....	19	5	....	5	1.3	....	....
14	Steak.....	15	22	....	2.1	3.1	....	....
657.2	.....	....	....	....	48.3	38.68	119.0	....
76	(Less turkey, lamb, and bread left over).....	....	....	....	7.9	2.06	23.6	....
581.2	Divided by 130.....	....	....	....	40.4	36.62	95.4	....
4.4	Per person, nutrients.....	....	....	....	.310 Gms.	0.281 Gms.	0.733 Gms.	....
	Daily average for the 6 months, nutrients.....	....	....	....	126.5 114.7	102 332.0	2946 2937	

The method of keeping daily accounts for the purpose of checking the cost is shown in the following table

TABLE XV

SATURDAY, MARCH 17

Constants.....	\$13.51
<i>Breakfast:</i>	
1 bunch bananas.....	\$1.25
2.5 dozen oranges (K.).....	0.30
5 lbs. farinose.....	0.22
Fried potatoes.....	0.00
6 dozen eggs, scrambled (B. and K.).....	1.08
Beef, frizzled (F.).....	0.00
15 lbs. potatoes (F.).....	0.19
	—
	3.04
<i>Luncheon:</i>	
Irish stew (F.).....	\$0.00
Meat in brown gravy (B. and K.).....	0.00
16 loaf cakes.....	1.28
60 lbs. sweet potatoes, baked.....	1.00
Fruit sauce.....	0.00
	—
	2.28
<i>Dinner:</i>	
9 lbs. potatoes for soup.....	\$0.12
26 " turkey, roast (F.).....	2.60
14 " steak (B.).....	1.96
41 " lamb, boiled (K.).....	3.48
50 " potatoes.....	0.63
3 " boiled hominy.....	0.06
Tapioca pudding (K. and B.).....	0.60
Lemon sherbet (F.).....	0.80
Watercress.....	0.25
	—
	10.53
Total for the day.....	\$29.36

[Note: K, B, and F represent three halls.]

TABLE XVI. COMPARISON OF A SCHOOL DIETARY WITH THE UNIVERSITY OF CHICAGO DIETARY

	Quantity per person per day.		Proportion of total cost of each article.	
	Lbs., Indiana.	Lbs., Chicago.	Indiana.	Chicago.
Beef.....	0.476	0.442	0.17	0.128
Other meats.....		0.401	.....	0.141
Fish.....	0.119	0.052	0.067	0.022
Flour and grain.....	0.785	0.437	0.125	0.103
Potatoes.....	1.085	0.680	0.090	0.036
Vegetables (other than potatoes).....	0.490	0.219	0.05	0.024
Beans.....	0.057	0.015	0.008	0.002
Milk.....	0.666	1.295	0.073	0.108
Cream.....		0.120	.....	0.041
Sugar.....	0.135	0.140	0.056	0.029
Sirup.....	0.095	0.017	0.017	0.006
Butter.....		0.089	.....	0.103
Butterine.....	0.119	0.014	0.134	0.011
Dried fruits.....	0.171	0.090	0.057	0.031
Fresh " {	0.259	0.508	0.070	0.052
Canned " {			.....	0.013
Sundries.....		0.022	.....	0.025
Tea, coffee.....	0.026	.....	0.047	0.013
Cocoa, chocolate.....		0.006	.....	0.029
Eggs and cheese.....		0.043	.....	0.036
Unclassified groceries.....	0.095	0.020	0.036	0.083

About 38 per cent of the Chicago Dietary is high-class food; 62 per cent of 25 cents = 15.5 cents, a price for which common food materials may be had.

The data given in Table XVII was recently reported\* as being worked out at Hamilton Hall, Montana State College, Bozeman, Montana, and may serve as a more modern illustration of the requirements in a college dormitory.

\* Alberta Borthwick, Journal of Home Economics, March, 1917.

TABLE XVII

Average energy value per day.....	2549 calories
Average protein value per day.....	73 grams
Calories supplied by protein.....	12 per cent
Nutritive ratio per day.....	8
Average CaO per day .....	0.7816 grams
Average P <sub>2</sub> O <sub>5</sub> per day.....	2.335 grams
Average iron per day.....	0.0148 grams
Average base excess per day.....	10.12

*Expenditures for different classes of food*

	Per Cent
Meat and fish.....	32.517
Eggs.....	5.794
Milk, cheese, and cream.....	8.377
Fats.....	11.492
Sweets.....	7.264
Fruits.....	12.21
Nuts.....	0.275
Vegetables.....	8.608
Cereals.....	5.347
Miscellaneous.....	7.715

*Cost per day per capita*

Food.....	\$0.37
Operating expenses.....	0.17
Upkeep.....	0.04

The ultra-hygienist will at once exclaim over the pork products allowed in some of the quoted dietaries, but man has not yet discovered any food which, for the money, gives the combination of flavor and nutritive value of well-cooked ham, bacon, and salt pork. Like every other food-substance, its source and handling must be satisfactory; but the author firmly believes that there is to-day more danger from the use of milk than from the use of pork products.

If the quantity used is kept down to five or six per cent of the total meat and used chiefly in the late winter and spring, when the appetite begins to need stronger flavors, it will not harm the majority of healthy persons. Those with delicate digestions will avoid these products along with many other things.

Butterine and oleomargarine will also come in for a share of condemnation. It is one of the greatest legislative sins of this country that the diet in so many State institutions is restricted and made less effective by the prohibition of the animal fats which can be supplied at less cost and in better condition than the third- or fourth-rate quality of butter which is made to take its place.

In the low-cost dietaries, dried fruits must be made to take the place in a measure of the more expensive green garden vegetables. The former can be furnished for so small a cost that there is no excuse for their absence.

Where there is a large family to be fed, a much better dietary can be made if the special preferences of members are considered alternately; also if unexpected variations occur. Curiosity will be stimulated, and curiosity is one of the best appetisers.

The following bill of fare was served in 1915 at a Commons for summer students — cost 25 to 30 cents per person per day. 200 served.

## MENU FOR SUMMER STUDENTS

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TABLE XVIII

	<i>Breakfast</i>	<i>Dinner</i>	<i>Supper</i>
Sun.	Muskmelon Cereal Rolls and butter Coffee	Chicken Mashed potatoes String beans Tomato jelly salad Ice cream and cake Coffee Bread and butter	Cheese on crackers Currants Cake Cocoa Bread and butter
Mon.	Honey Cereal Baking powder biscuit Coffee	Chicken soup with rice Beef loaf Mashed potatoes Corn Chocolate blanc mange Coffee Bread and butter	Potato hash Pickles Sliced peaches Cake Cocoa Bread and butter
Tues.	Bananas Cereal Toast and butter Coffee	Vegetable soup Roast beef Mashed potatoes Buttered beets Cherry pie Coffee Bread and butter	Rice with cheese Lettuce Berries Cake Tea Bread and butter
Wed.	Currants Cereal Graham muffins and butter Coffee	Noodle soup Roast pork Apple sauce Potatoes Spinach Watermelon Coffee Bread and butter	Scalloped corn Raspberries Cake Tea Bread and butter

TABLE XVIII (*Continued*)

	<i>Breakfast</i>	<i>Dinner</i>	<i>Supper</i>
Thurs.	Gooseberries Cereal Corn muffins and butter Coffee	Baked bean soup Corned beef Vegetables Boiled potato with butter and pars- ley Bread pudding Coffee Bread and butter	Creamed eggs Pickled beets Cake Cocoa Bread and butter
Fri.	Cherries Cereal White muffins and butter Coffee	Tomato soup Fish, mashed po- tato Pickles Carrots and peas Steamed apple pudding, lemon sauce Coffee Bread and butter	Hash Sliced peaches Cake Tea Bread and butter
Sat.	Prunes Cereal Biscuit and butter Coffee	Macaroni soup Roast lamb Mashed potatoes Creamed turnips Bananas with cus- tard Coffee Bread and butter	Creamed dried beef Berries Cake Cocoa Bread and butter
	Milk served with each meal.		

## CHAPTER XIII

### FORTY TO FIFTY CENTS PER PERSON PER DAY

"Its character, however, was that it was in season; that it was up to its time; that it was in the spirit of the age; that there was no *perruque* in its composition, no trace of the wisdom of our ancestors in a single dish. Every meat presented its own natural aroma, every vegetable its own shade of color." — *Lady Morgan's sketch of a dinner by Careme at the Baron Rothschild's villa.*

A GOOD way to keep the run of a family dietary is to determine the necessary quantities of the articles of daily and weekly consumption. These should give two-thirds the quantity needed at one-third the total cost, that is, at 10 to 15 cents; then add the variety in the variables which should not all be "hearty" the same meal; for instance, peas, macaroni, and custard. Sweet dessert is not needed after beets and fried bananas served as vegetables.

To the person making out the bill of fare, the name of the food should bring to mind the percentage composition as well as the shape, color, and flavor.

With an income of \$3000 or \$3500 per year a family of five spending 25 per cent of it on food and having occasional guests, as all families should, must plan to spend not more than 40 or 50 cents per day per person. This means \$2.00 to \$2.50 a day for the family, or \$730 to \$900 per year with an additional \$75 for guests and extras.

This can only be done, without the family knowing that they are in any way restricted, by the exercise of care and thought, and by a careful watching of the markets by the provider. Food purchased in its season, when it is cheap *because it is abundant*, and a judicious treatment of inexpensive foods, with small amounts only of the dearer ones, will give a surprisingly good bill of fare.

Every thoughtful person must have wondered why it is that a *table d'hôte* dinner can be served so cheaply. It is a common experience to enjoy a well-cooked, well-served six-course dinner for 50 or 60 cents, whereas if one orders, *à la carte*, even four courses, it is likely to be nearly three times as much. One reason for the satisfied feeling with which one not only leaves the table but passes the evening is that the chefs at the restaurants famous for their *table d'hôte* dinners know how to blend flavors and consistency so as to get the fullest result; each dish is the complement or the background of the next. Again, the condiments and sauces are of the savory and not of the heavy, irritating kind, which means that the cooking is French rather than American. The quantities served are just enough and not too much; therefore, nothing is wasted. No allowance is made for that setting to one side the barely tasted dish which is so frequently seen, and which has been referred to as so demoralizing. Just this same care must be given by the mistress or housekeeper to insure living on 40 cents a day. It needs only a superficial acquaintance with modern kitchens and cooks to explain why this figure is so seldom held to.

The following menu has been worked out for a cost of

50 to 60 cents (fall of 1916), and the details are given in Table XIX.

Breakfast: Oranges, farina and cream, toast and butter, coffee.

Luncheon: Creamed asparagus (canned) on toast, baked apple, lady fingers, tea.

Dinner: Beefsteak, mashed potato, celery, cabbage, lettuce, cucumber and tomato salad, French dressing, peaches and cream, bread and butter.

TABLE XIX. AMOUNTS AND COST OF 50 CENT MENU

	Meas- ure.	Weight, grams.	Cost.	Pro- tein, grams.	Ash constituents.			Poten- tial energy, calo- ries.
					CaO, grams.	P <sub>2</sub> O <sub>5</sub> , grams.	Fe, grams.	
<i>Breakfast</i>								
Orange.....	½ large	165.56	....	1.32	0.09934	0.08278	0.00050	85.10
Farina.....	2 tbsp.	22.4	....	2.46	0.01366	0.20205	0.00119	80.68
Cream.....	6 tbsp.	90	....	2.25	0.12600	0.16200	0.00018	175.05
Toast.....	2 slices	42.50	....	3.92	0.01274	0.08500	0.00038	110.04
Butter.....	1 tbsp.	14.06	....	0.14	0.00281	0.00422	....	108.14
Sugar.....	2 tbsp.	25	....	....	....	....	....	100
			\$0.11	10.09	0.25455	0.53605	0.00225	659.01
<i>Luncheon</i>								
Asparagus (canned).....	....	100	....	1.80	0.04000	0.09000	0.00100	19.00
Toast.....	2 slices	42.50	....	3.92	0.01274	0.08500	0.00038	110.04
Milk.....	1½ c.	302.5	....	9.99	0.50820	0.65037	0.00072	209.32
Butter.....	1½ tbsp.	21.09	....	0.21	0.00422	0.00633	....	162.21
Flour.....	½ tbsp.	3.53	....	0.40	0.00088	0.00706	0.00005	12.49
Cream.....	1½ tbsp.	22.50	....	0.56	0.03150	0.04050	0.00004	43.76
Sugar.....	1 tbsp.	12.50	....	....	....	....	....	50.00
Apple.....	....	130.00	....	0.52	0.01820	0.03900	0.00039	75.53
Lady fingers....	2	39.60	....	3.48	0.00757	0.04034	0.00010	143.28
			\$0.13	20.88	0.62331	0.95860	0.00268	825.63
<i>Dinner</i>								
Beefsteak.....	2 lb.	151.0	....	28.54	0.01660	0.75500	0.00572	365.58
Potato.....	½ c.	80	....	1.76	0.01280	0.11200	0.00104	65.36
Celery, cabbage	4 oz.	113	....	1.81	0.07684	0.10170	0.00124	30.62
Bread.....	2 slices	42.50	....	3.92	0.01274	0.08500	0.00038	110.04
Butter.....	2 tbsp.	14.06	....	0.28	0.00562	0.00844	....	216.28
Tomato.....	½ large	75	....	0.68	0.01500	0.04425	0.00030	15.30
Cucumber.....	....	75	....	0.60	0.01650	0.06000	....	10.95
Lettuce.....	2 leaves	20	....	0.24	0.01000	0.01800	0.00020	3.26
Peaches.....	1	84.75	....	0.59	0.00848	0.03983	0.00025	22.80
Cream.....	2 tbsp.	30	....	0.75	0.04200	0.05400	0.00006	58.35
Oil (olive).....	1 tbsp.	13.5	....	....	0.02295	0.00405	0.00039	121.50
Vinegar.....	½ tsp.	2.5	....	....	0.00050	0.00125	....	....
Lemon juice.....	½ tsp.	2.5	....	....	0.00083	0.00063	....	0.98
Milk.....	½ tbsp.	7.56	....	0.25	0.01271	0.01626	0.00002	5.23
Gelatine.....	....	....	....	....	....	....	....	....
			\$0.28	39.42	0.25357	1.30041	0.00960	1026.25
Breakfast.....	....	....	....	10.09	0.25455	0.53605	0.00225	659.01
Luncheon.....	....	....	....	20.88	0.62331	0.95860	0.00268	825.63
Dinner.....	....	....	....	39.42	0.25357	1.30041	0.00960	1026.25
Total.....	....	....	\$0.52	70.39	1.13 <sup>1/2</sup>	2.79506	0.01453	2510.89

TABLE XX  
(Compiled from "Feeding the Family" by Mary Swartz Rose.)

	100 calorie portion.		Distribution of calories.		
	Measure.	Weight, ounces.	Pro-	Fat.	Carbohy-
			tein.		drate.
<i>Cereal products</i>					
Bread.....	2 slices	1.3	14	6	80
Baking powder biscuit.....	2 small biscuits	1.3	11	27	62
Corn meal, uncooked.....		0.99	.....	.....	.....
Corn meal, cooked.....	½ cup	6.0	10	5	85
Macaroni, uncooked.....		0.99	.....	.....	.....
Macaroni, cooked.....	1 cup	5.2	15	2	83
Oatmeal, uncooked.....		0.88	.....	.....	.....
Oatmeal, cooked.....	1 cup	7.9	17	16	67
Rice, uncooked.....		1.01	.....	.....	.....
Rice, cooked.....	½ cup	4.0	9	1	90
<i>Dairy products</i>					
Butter.....	1 tbsp. (scant)	0.5	1	99	.....
Cheese, Am. pale.....	1 ½ in. cube	0.8	26	71	3
Cream, thin (18% fat).....	½ cup	1.8	5	86	9
Cream, thick (40% fat).....	1 ½ tbsp.	0.9	2	95	3
Milk, whole.....	½ cup	5.1	19	52	29
Oleomargarine.....	1 tbsp.	0.5	1	99	.....
Eggs.....	1 ½ eggs	2.7	36	64	.....
<i>Fruits</i>					
Apples, fresh.....	1 large	7.5	3	5	92
Bananas.....	1 large	5.5	5	6	89
Olives, green.....	6-8 olives	1.6	1	83	16
Olives, ripe.....	6-8 olives	1.7	3	90	7
Olive oil.....	1 tbsp.	0.4	.....	100	.....
Oranges.....	1 large	9.5	7	2	91
Peaches, fresh.....	3 medium	10.5	6	3	91
Strawberries, fresh.....	1 ½ cups	9.0	10	14	76
<i>Meats</i>					
Sirloin steak, lean slice broiled.....	2 in. × 1 ½ in. × ¼ in.	2.0	47	53	.....
Fish.....	Medium serving	2.4	72	28	.....
Lamb chop.....	1 chop	1.6	40	60	.....
<i>Nuts</i>					
Peanuts.....	20-24 single nuts	0.6	19	63	18
Walnuts, Eng.....	8-16 nuts	0.5	11	82	7
<i>Sugar</i>					
Corn syrup.....	1 ½ tbsp.	1.5	.....	.....	100
Molasses.....	1 ½ tbsp.	1.2	3	.....	97
Sugar, granulated.....	2 tbsp. (scant)	0.9	.....	.....	100
Sugar, loaf.....	3 ½ lumps, full size	0.9	.....	.....	100
<i>Vegetables</i>					
Asparagus, fresh.....	20 large stalks	15.9	32	8	60
Cabbage, shredded.....	5 cups	11.2	20	9	71
Celery.....	4 cups ¼ in. pcs.	19.1	24	5	71
Lettuce.....	2 large heads	18.5	25	14	61
Peas, green, shelled.....	½ cup.	3.5	28	4	68
Peas, dried.....		0.99	28	.....	.....
Potatoes, white.....	1 medium	3.0	11	1	88
Potatoes, white, mashed.....	½ cup (scant)	3.1	7	48	45
Tomatoes, fresh.....	½ medium	15.5	16	16	68

The "100 calorie portion" offers a convenient method for calculating dietaries, and is especially helpful in arranging the daily meals for the family. It has for its basis not a unit of weight but a unit of food value called a standard portion, an amount of food that furnishes 100 calories.

The weight and measure of the standard portion of some common foods are given in Table XX.

TABLE XXI

(Compiled from "Feeding the Family," by Mary Swartz Rose.)

COST OF STANDARD PORTIONS OF SOME COMMON FOODS.

1. Costing less than  $\frac{3}{4}$  cent per 100 calories:

Beans, dried	Macaroni
Bread	Molasses
Butter (24 cents per lb.)	Oatmeal
Cottonseed oil	Oleomargarine
Corn meal	Peas, dried
Flour	Rice, broken
Hominy	Sugar

2. Costing  $\frac{3}{4}$  to 1 cent per 100 calories:

Apples, dried	Corned beef (fat eaten)
Baking powder biscuit	Dates
Butter (not over 32 cents per lb.)	Irish stew with dumplings
Cheese, American	Prunes
Cookies, plain	Stuffed beef heart

3. Costing 1 to  $1\frac{1}{2}$  cents per 100 calories:

Apricots, dried	Cream
Bananas	Dried beef
Butter (over 32 cents per lb.)	Milk (7-13 cents per qt.)
Cabbage	Olive oil
Charlotte russe	Potatoes, Irish
Chocolate	Potatoes, sweet
Cocoa	

TABLE XXI (*Continued*)

4. Costing  $1\frac{1}{2}$  to 2 cents per 100 calories:
 

Beans, string, fresh	Codfish, salt
Beef, flank	Eggs (25-36 cents per doz.)
Beets, fresh	
Boiled salad dressing	
Buttermilk	
Carrots, old	
5. Costing 2 to 5 cents per 100 calories:
 

Almonds	
Apples, fresh	
Beef, lean round	
Beef, loin	
Oranges	
Walnuts, English	
6. Costing over 5 cents per 100 calories:
 

Beefsteak, choice cuts	Lobster
Celery	Mushrooms
Cod, fresh	Oysters, raw
Cucumbers	Peppers, green
Gelatine	Salmon, canned
Lettuce	Veal, loin

## CHAPTER XIV

### SIXTY CENTS OR MORE PER PERSON PER DAY; INCOME \$5000

"The pleasure of eating is common to us with animals; it merely supposes hunger and that which is necessary to satisfy it. The pleasure of the table is peculiar to the human species; it supposes antecedent attention to the preparation of the repast. . . . Dishes have been invented so attractive that they unceasingly renew the appetite, and which are at the same time so light that they flatter the palate without loading the stomach." — HAYWARD.

IF 25 or 30 cents is enough, how is it that double the amount is the rule? Even on an income of \$3000? There are several very evident reasons:

1. Waste.
2. Hothouse, out-of-season products.
3. Rare foods, of which there are not enough to go around.
4. Perishable food.
5. Fads, fashion in dishes.
6. Flavors, derived from expensive materials.

Are we any better mentally or physically for these flavors and stimulants? Is life more wholesome, more *efficient*? Efficiency is the key to the whole.

A large item of expense in small households is the maid's table. If it is difficult to keep down the cost in an institution where a separate meal is prepared, how much more difficult when the same food serves for both family and maid, and when the least curtailment in the kitchen is a signal for a change in serv-

ants! The cook does not count the potatoes, nor measure the strawberries, as the pioneer housekeeper did; neither does she save the cold potato and the ends of the steak for hash, as New England thrift demanded. The moral effect of this *lax lavishness* upon these inmates of our kitchens is a worse feature than the mere waste of money. What will happen when they marry and have homes of their own and have only \$800 a year, or less, for everything? Have we no responsibility toward those we employ and whose tastes and habits we form?

Even the busy woman, if once she gave time to starting her accounts properly and if once she had conquered the A-B-C of dietaries, could keep a fair oversight over her expenses without going to market or examining the ice-box.

If 60 cents a day furnishes all that the most fastidious person can require, how is it that \$1 and even \$1.50 per day is ever spent on raw food? It can be done only by using the most out-of-season delicacies, such as strawberries in January, or rare dishes as terrapin, choice game, etc. Of course, condiments and wines can easily bring up the expense, as they do at banquets where \$10 and \$20 per plate may be charged, but we are speaking of food.

"It is one of the evils of the present day that everybody strives after the same dull style. . . . I will observe that I think the affluent would render themselves and their country an essential service if they were to fall into the simple, refined style of living, discarding everything incompatible with real enjoyment." — WALKER in *The Original*, 1835.

This hyperæsthetic sense as to the furnishing of the table is not to be imitated by the sensible young men and young women for whom this little book is written.

There is more in life than meat. "He that ruleth his appetite is greater than he that buildeth a great market."

## CHAPTER XV

### THE PLANNING OF MEALS

"A fundamental principle is that the diet, considered for any reasonable length of time, must supply a great variety of chemical substances combined in different ways for the "structural" needs of the body, and also must supply it with energy-yielding substances with which it may perform internal and external work. It seems apparent that a varied diet, reasonably generous in amount, is more likely to meet the body needs than one restricted or unvarying in its make up or scant in quantity. The more knowledge and judgment used in its selection, the better the diet is likely to be."

— LANGWORTHY.

FOR the many who are unable or unwilling to carry out such calculations as involve the consultation of tables of food values there have been a number of attempts to provide simpler methods for insuring the right choice of foods in the everyday diet. One of the latest of these suggestions has been offered by the U. S. Government.

\* "The Department of Agriculture has endeavored to classify common foods in a way corresponding to their distinctive functions in nutrition. The division must be more or less arbitrary, for some foods could go almost equally well in two or more groups. Thus milk, which is a general food, is included with the protein foods because it is a valuable source of this nutrient. Bread is a carbohydrate food, a protein food, and an ash-yielding food, but it is classed as a carbohydrate food

\* Langworthy.

because its most obvious constituent is starch, and because we use it in the same general way as we do starchy foods like potatoes. The classification as now arranged consists of five groups, and it is the understanding that each of these groups should be represented, if not at every meal, at least once a day, and that if an excessive number of food materials from any one group are used in the course of a day the result is likely to be unsatisfactory from the standpoint of rational dietetics or of taste."

The groups may be described in terms of the dietitian as follows:\*

(1) Those whose chief value is mineral constituents and vegetable acids (the latter important from the standpoint of flavor as well as of body needs); (2) foods in which protein bears a higher proportion to fuel value than it does in the well-chosen diet as a whole; (3) those in which fuel value is high in proportion to protein, owing chiefly to the presence of much starch; and (4) those which have a high fuel value, but in this case due to the presence of sugar. From the standpoint of fuel value only, it is obvious that Groups 3 and 4 could be combined. From the standpoint of the well-chosen and palatable meal, on the other hand, they should be kept distinct, since sugar is frequently as important as a flavor as it is as a food. (5) Those in which fuel value is high, owing to the large percentage of fat.

In housekeepers' terms the groups may be described as: (1) watery fruits and vegetables (excluding dried legumes and fruits which have been dried or combined

\* Food Selection for Rational and Economical Living, Langworthy. (Slightly rearranged in accordance with Bulletin 808.)

with much sugar); (2) foods high in protein or flesh foods (except the very fattest), milk, cheese, eggs, and such meat substitutes as dried beans, peas, and other legumes, and some of the nuts; (3) starchy foods; (4) sweets; (5) fat foods.

*Some common foods grouped according to their characteristics*

(All five groups should be represented in the diet every day.)

\* Group 1 — Foods depended on for mineral matters, vegetable acids, and body-regulating substances.

Fruits:	Vegetables:
Apples, pears, etc.	Salads, — lettuce, celery, etc.
Bananas	Potherbs, or "greens"
Berries	Potatoes and root vegetables
Melons	Green peas, beans, etc.
Oranges, lemons, etc.	Tomatoes, squash, etc.
Etc.	Etc.

Group 2 — Foods depended on for protein.

Milk, skim milk, cheese, etc.	Fish
Eggs	Dried peas, beans, cowpeas, etc.
Meat	Nuts
Poultry	

Group 3 — Foods depended on for starch.

Cereal grains, meals, flours, etc.	Cakes, cookies, starchy pudding, etc.
Cereal breakfast foods	
Bread	Potatoes and other starchy vege- tables
Crackers	
Macaroni and other pastes	

Group 4 — Foods depended on for sugar.

Sugar	Candies
Molasses	Fruits preserved in sugar
Sirups	Jellies, and dried fruits
Honey	Sweet cakes and desserts

Group 5 — Foods depended on for fat.

Butter and cream	Salt pork and bacon
Lard, suet, and other cooking fats	Table and salad oils

\* Farmers' Bulletin 808, How to Select Food, Hunt & Atwater.

"Thinking of foods according to the group to which they belong or according to the nutrient which they supply in largest amount will help the housekeeper to see whether in the meals she plans she has supplied all the different materials needed, especially whether there is the necessary, though small, amount of tissue-building mineral matters and body-regulating materials, and of tissue-building protein. When she has made sure that these are present, she may safely build up the bulk of the diet from whatever materials from the other groups seem economical, wholesome and appetizing."

At least two meals out of the three should contain a member of each of these groups, and care should be taken to see that no group is represented too many times. In one poorly planned day's menu, for example, 16 food materials were used and of these 9 were from group 2, giving an excess of protein. In another menu 9 out of 19 food materials were chosen from group 5, giving an excess of fat.

It is impossible under ordinary conditions for the housekeeper to determine exactly how much of each different nutrient every member of the family needs even though she knows that "an elderly person, or one of quiet habits, needs less food than a vigorous young one; a large person more than a small one; a man more than a woman; grown persons more than children; and a farmer working in the hayfield, a mechanic, or a football player more than a man who sits at his desk all day." Neither could she be sure if she had done this that each member of the family would eat his fair portion. She can, however, be sure of including the necessary foods,

and she can substitute foods from the same group when she has more or less to spend.

If in addition to the study and use of these groups the housekeeper make herself familiar with the appearance of the "100 calorie," or so called "standard" portion of the common foods, she can estimate roughly the amount and character of the food she is serving to her family.

Whether she is doing this satisfactorily she may determine by the general condition of their health.

"The health and appearance of the family are a good test of the wholesomeness of their diet. If they are strong, well developed for their ages, free from ailments, and full of energy and ambition, one may safely say their food agrees with them. But if they are listless and ailing, or not as well developed either physically or mentally as they should be, and if a competent physician finds that there is no special disease to account for these bad symptoms, a mother may well ask herself if the food is right, and if not, how she can make it so."

## GLOSSARY

*Calorie.* The unit used for measuring the fuel value of foodstuffs. 1 Calorie is the amount of heat required to raise 1 kilogram of water, 1 degree Centigrade. As burned in the body, 1 gram of protein or carbohydrate yields 4 Calories, and 1 gram of fat 9 Calories. The Calorie as just defined is known as the large Calorie, and should be spelled with a capital C. This is not always done in books on food.

*Carbohydrate.* A foodstuff containing the elements carbon, hydrogen, and oxygen, the two latter being in the same proportion as in water. Examples: starch, sugars.

*Digestion.* The process which a food undergoes in preparation for its absorption in the intestines and subsequent use in the body. The changes are produced largely by ferments or enzymes secreted by the body cells.

*Fat.* (Lipin.) Used broadly the term "lipin" includes all the substances soluble in so-called fat solvents such as ether. As applied more specifically to foods, a fat is a foodstuff containing the elements carbon, hydrogen, and oxygen, which yields on hydrolysis (reaction with water), glycerin and a fatty acid. This splitting, as carried on by an alkali, gives a soap, and the process is known as saponification. Examples: butyrin, stearin, palmitin. Ordinary fats and oils are mixtures of substances of this nature. The terms "fat" and

"oil" cover the same kind of foodstuffs. When liquid at ordinary temperatures "oil" is used, when solid, "fat."

*Fermentation.* The action of microorganisms (bacteria, yeasts, molds), on complex organic matter with the production of simpler substances. More specifically, the term is used commonly in connection with the action on carbohydrates with the production of alcohol and carbon dioxide.

*Food.* "All those substances which supply the body either with matter needed for its substance or with energy for its activities." (Sherman.)

*Foodstuffs.* The individual compounds constituting the food. The principal foodstuffs are carbohydrates, fats, and proteins, which see.

*Food Accessories.* Substances, not included under the term "foodstuffs," of unknown composition, which are necessary for the maintenance of normal nutrition. See vitamins.

*Glycogen.* Called "animal starch." A carbohydrate stored in the liver as a reserve supply for the animal needs.

*Metabolism.* The process through which the food-stuffs pass in the body. The word includes not only chemical but also energy transformations.

*Nutrition.* "The sum of the processes concerned in the growth, maintenance, and repair of the living body as a whole, or of its constituent organs." (Lusk.)

*Nutritive Value.* "The value of the food as a source of energy for maintaining the work of the body and of material for preventing or replacing the waste of body substance, or for growth." It is judged "(i) by its

chemical composition, (2) by its behavior in digestion, (3) by its behavior in metabolism." (Sherman.)

*Oil.* See Fat.

*Protein.* A foodstuff containing the elements carbon, hydrogen, oxygen, and nitrogen, with usually sulphur and phosphorus, which yields simpler compounds called amino acids, when subjected to certain processes such as occur during digestion. The distinctive element is nitrogen, since the proteins alone furnish this to the human system. Examples: egg albumin, gelatin.

*Ptomaines.* Poisonous substances supposed to be produced during the putrefaction of foods such as fish or meat. There is some doubt as to whether these substances actually exist, since the poisonous effects may be due to the bacteria present in the putrefying foods and acting in the body.

*Putrefaction.* A fermentation of nitrogenous material generally yielding obnoxious substances.

*Starch.* A carbohydrate made and stored by plants. It is of great importance as a food since it constitutes  $\frac{1}{2}$  to  $\frac{3}{4}$  of cereal grains.

*Vitamines.* Food accessories of unknown composition whose presence is necessary for normal nutrition. They are probably nitrogenous substances. They are present in many raw foods, such as milk and egg yolk.

## CONVERSION FACTORS

### THERMOMETER SCALES

To convert the reading on a Centigrade thermometer to degrees Fahrenheit, multiply the reading by  $\frac{9}{5}$  and add 32.

To convert the reading on a Fahrenheit thermometer to degrees Centigrade, subtract 32 and multiply by  $\frac{5}{9}$ .

### METRIC AND CUSTOMARY UNITS

#### Length:

1 inch	2.54 centimeters.
1 foot	0.3 meter.
1 yard	0.91 meter.
1 mile	1.6 kilometers.
1 centimeter	0.39 inch.
1 meter	3.28 feet, 1.09 yards.
1 kilometer	0.62 mile.

#### Capacity:

1 liquid ounce	29.57 cubic centimeters.
1 liquid quart	0.95 liter.
1 liquid gallon	3.79 liters.
1 liter	338 liquid ounces, 1.06 liquid quarts.
1 dry quart	1.1 liters.
1 liter	0.9 dry quart.

#### Weight:

1 grain	0.06 gram.
1 ounce avoirdupois	28.35 grams.
1 pound avoirdupois	453.6 grams, 0.453 kilogram.
1 gram	15.4 grains, 0.035 ounce avoirdupois.
1 kilogram	2.2 pounds avoirdupois.

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